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SYMPOSIUM on PAIN

The Symposium on Pain in the January (Chicago) Number of the *Medical Clinics of North America* deals comprehensively with one of the most urgent problems in both medical and surgical practice. It is, therefore, of great importance to family physician, surgeon and specialist alike.

There are 9 clinics in this Symposium, covering the Differential Diagnosis and Treatment of Head Pain, of Pain Arising from Female Pelvis, of Pain Arising from Lesions of Nerves and Spinal Cord, and of Pain Arising in Circulatory System; Abdominal Pain and Its Clinical Significance; Pain in Muscles, Bones and Joints; Relief of Cardiac Pain; Relief of Painful Feet; and Control of Pain in Cancer.

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ANGINA PECTORIS, CORONARY FAILURE AND ACUTE MYOCARDIAL INFARCTION

THE ROLE OF CORONARY OCCLUSIONS AND COLLATERAL CIRCULATION

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AND
PAUL M. ZOLL, M.D.
BOSTON

Despite the rapid advance in our knowledge of cardiovascular disease, pathologic examination of the heart frequently fails to disclose the conditions which are anticipated on the basis of the clinical diagnosis. The clinical diagnosis of "coronary thrombosis" is often made but no thrombosis may be found; in other instances a fresh infarct is disclosed but no fresh thrombosis of any arteries supplying the affected area may be evident. Conversely, fresh coronary thrombosis or complete occlusions of main coronary arteries may be found post mortem but without any corresponding clinical phenomena. Because of the frequent disparities between clinical diagnoses and pathologic observations a detailed clinical and pathologic study was made in a consecutive series of necropsies. In the pathologic examination of the heart, a method devised by one of us (M. J. S.) was used,[1] since it affords more precise information regarding the structural changes of the coronary arteries. The results in 125 cases have been described by us.[2] Our purpose in the present communication is to summarize the results obtained in a more comprehensive series of 355 cases utilizing additional technics to clarify some of the problems involved. Particular attention has been directed to the structural cardiac changes and their functional significance in order to gain insight into the clinical problems associated with angina pectoris, coronary thrombosis and myocardial infarction. The importance of the collateral circulation in obviating the effects of obstruction to the coronary arteries is to be emphasized.

Owing to the lack of space, this article is abbreviated here. The complete article appears in the authors' reprints.

This investigation was aided by a grant from the Josiah Macy Jr. Foundation.

Read before the Section on Practice of Medicine at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

From the Departments of Medical Research and Pathology of the Beth Israel Hospital and the Departments of Medicine and Pathology, Harvard Medical School.

1. Schlesinger, M. J.: An Injection Plus Dissection Study of Coronary Artery Occlusions and Anastomoses, Am. Heart J. **15**: 528 (May) 1938.

2. Blumgart, H. L.; Schlesinger, M. J., and Davis, David: Studies on the Relation of the Clinical Manifestations of Angina Pectoris, Coronary Thrombosis and Myocardial Infarction to the Pathologic Findings, with Particular Reference to the Significance of the Collateral Circulation, Am. Heart J. **19**: 1 (Jan.) 1940.

METHODS

Pathologic Methods.—The technic used in injecting and dissecting the heart has been described[1] and summarized[2] previously and therefore will be only briefly stated here. The right and left coronary arteries were injected simultaneously with differently colored radiopaque masses under a pressure of from 150 to 200 mm. of mercury. The heart was then unrolled so that all of the coronary arteries lay in one plane and a roentgenogram was made. A complete dissection of the arteries was then carried out. Multiple representative sections of the myocardium were studied histologically. Instead of presenting colored copies of the actual roentgenograms we have prepared tracings of the coronary arterial tree of each heart.

Chemical Methods.—To study the effects of coronary arterial narrowing and occlusion on the myocardium, an estimate of the amount of fibrosis was made by measuring chemically the collagen content of the myocardium. This method affords a quantitative estimate of the degree of fibrosis in the myocardium. The collagen method has been described previously,[3] and the results obtained in a series of hearts have been reported.[4]

Clinical Methods.—Since the main purpose of this study was to understand clinical signs and symptoms more clearly and accurately, only those cases were included in which detailed clinical information could be obtained from reliable sources.

OBSERVATIONS IN THE NORMAL HEART (I. E., HEARTS WITH LITTLE OR NO CORONARY ARTERIOSCLEROSIS OR OTHER ABNORMALITIES FROM PATIENTS WITH NO CLINICAL EVIDENCE OF CARDIOVASCULAR DISEASE AND DYING OF NONCARDIAC DISEASE)

While it was formerly believed that the coronary arteries were end arteries, it gradually has become the opinion of most investigators that communications may exist between the coronary arteries. The extent and nature of these communications, the conditions which favor their development and their functional significance are, however, still not clear. Watery solutions injected into one coronary artery are always found in the other large coronary arteries, demonstrating that even in the normal heart fine communications exist between the main coronary arteries. When, however, normal hearts were injected with the colored lead agar mass utilized in these studies, passage of the mass from one coronary artery to the other side was unusual. Since the lead agar suspension penetrates regularly only as far as arterioles 40 microns in diameter, interarterial collateral pathways of 40 microns or more may be regarded as generally absent in normal hearts. Previous studies[5] have demonstrated however

3. Gilligan, D. R., and Lowry, O.: A Method of Measuring the Collagen Content of Small Amounts of Muscle and Other Tissue, to be published.

4. Blumgart, H. L.; Gilligan, D. R., and Schlesinger, M. J.: The Degree of Myocardial Fibrosis in Normal and Pathological Hearts as Estimated Chemically by the Collagen Content, Tr. A. Am. Physicians, volume 55, to be published.

5. Schlesinger.[1] Blumgart, Schlesinger and Davis.[2]

that, if narrowing of a coronary artery occurs, these larger collateral pathways develop and supply that area of the myocardium which would otherwise suffer from diminished blood flow. Vessels of this larger size are of major importance in obviating the effects of arterial narrowings and occlusions; on the other hand, the fine interarterial coronary communications of less than 40 microns in diameter do not prevent infarctions following sudden thrombotic or embolic occlusion of a coronary

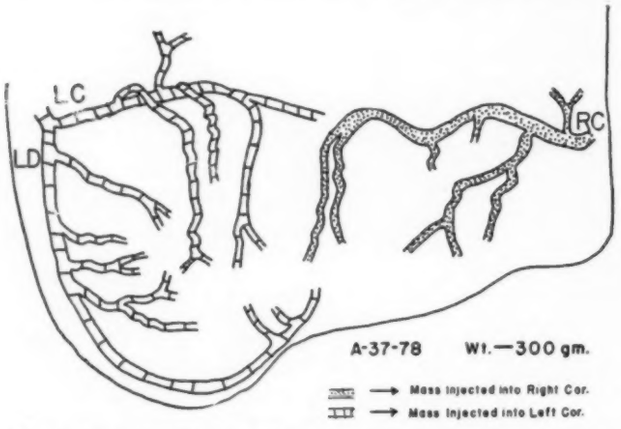

Fig. 1 (case 1).—Diagram of normal coronary arterial tree of man aged 72.

artery clinically or after experimental ligation of an artery. The collateral pathways which hitherto have attracted particular attention communicate between arteries and the cavities of the heart or between capillaries, veins and cavities of the heart. The collateral pathways demonstrated in abnormal hearts by the lead agar mass communicate between coronary arteries and therefore would appear to be more significant in the maintenance of capillary blood flow.

It was of particular interest to observe many normal hearts in this series with little or no coronary arteriosclerosis or other abnormalities in patients over 70 years of age. This indicates that the development of an anastomotic circulation is not a necessary concomitant of the aging process, a conclusion somewhat contrary to the experience of others.[6]

CASE 1.—A man aged 72 died of fibrosarcoma of the femur; the heart was normal and there was no arteriosclerosis or other abnormality in the coronary arteries. Figure 1 is a diagram of the coronary arterial tree.

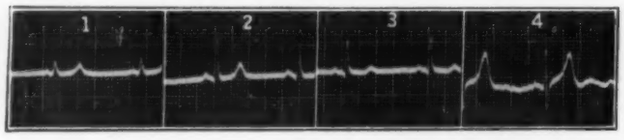

Fig. 2 (case 2).—Normal tracing one year before death.

The foregoing observations are based on a study of 149 cases which showed no clinical evidences of cardiovascular disease and in which the hearts post mortem were structurally normal in every respect. The conclusions derived from the observations in this extensive series are in accord with those recorded previously;[5] regardless of the age of the subject, normal hearts regularly have fine interarterial coronary communications but do not possess an anastomotic circulation of vessels large enough to be functionally significant in obviating the untoward effect of rapidly developing coronary narrowing or occlusion.

6. Gross, Louis: The Blood Supply to the Heart in Its Anatomical and Clinical Aspects, New York, Paul B. Hoeber, 1921. Spalteholz, Karl Werner: Die Arterien der Herzwand, Leipzig, S. Hirzel, 1924. Campbell, J. S.: Stereoscopic Radiography of the Coronary System, Quart. J. Med. **22**: 247, 1929.

OBSERVATIONS IN CASES WITHOUT CLINICAL CARDIOVASCULAR DISEASE IN WHICH THE HEART SHOWED OLD HEALED COMPLETE OCCLUSION IN AT LEAST ONE CORONARY ARTERY

Complete occlusion or considerable narrowing of one or more coronary arteries may exist without giving rise to any clinical symptoms or signs. Thirty-eight cases with old occlusions of the main coronary arteries or primary branches were found without related clinical signs or symptoms. Thirty-four additional hearts showed considerable narrowing, but no occlusion, of one or more of the main coronary vessels without clinical symptoms or signs of cardiovascular disease. In those cases in which electrocardiographic tracings were available the complexes were normal.

This apparent inconsistency between the presence of long standing obstructive arterial lesions and the absence of significant pathologic or clinical evidence of myocardial damage was dispelled by the demonstration of a

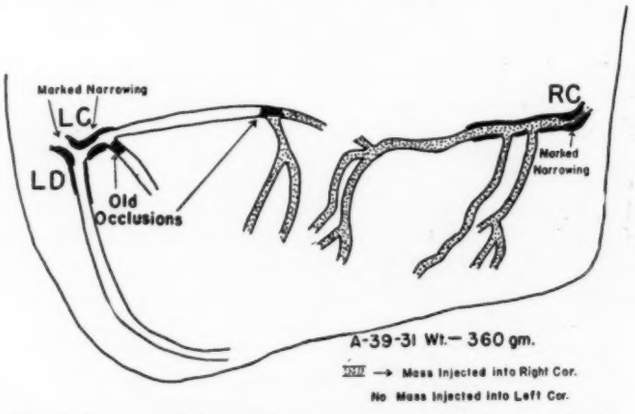

Fig. 3 (case 2).—Diagram of coronary arterial tree: unilateral injection of lead agar mass into right coronary artery.

collateral circulation in relation to the obstruction in each of these hearts. This collateral circulation was clearly demonstrated by the injection mass and, in each instance, served as a by-pass around the arterial obstruction. In some hearts the collateral pathways communicated between portions of the same artery proximal and distal to the occlusion; in other instances the artery distal to the occlusion derived its supply from distant vessels. While the collateral circulation generally safeguards the heart from serious myocardial damage, the occurrence of a sudden occlusion may result in acute myocardial infarction if time is insufficient for the further development of adequate anastomotic vessels. Case 2 illustrates the presence of old occlusions of the coronary arteries and anastomotic circulation without symptoms of coronary insufficiency.

CASE 2.—*No angina pectoris or congestive failure. Death due to biliary obstruction (fig. 2).*

Carcinoma of pancreas and stone in ampulla of Vater. Complete occlusions of main stem and primary branch of left circumflex artery. Vessels distal to occlusions injected by collateral circulation from right coronary artery. Myocardium showed moderate fibrosis and no infarction (fig. 3).

This case illustrates that anastomotic circulation develops in relation to arterial occlusions. Despite the occlusions and narrowing of all three main arteries, no symptoms or signs of cardiac disease had been present.

The anastomotic circulation, so well visualized by the unilateral injection in this heart, must be considered largely responsible for the absence of cardiac pain or any area of infarction.

In the foregoing cases in which there was no fibrosis and no infarction, the coronary sclerosis leading to narrowing and occlusion evidently proceeded so slowly

TABLE 1.—*Angina Pectoris as Primary Cardiac Symptom; Thirty-Eight Cases*

	Cases
I. Complete old occlusion of one or more main coronary arteries	29 *
a. Without valvular lesions	24 cases
b. With valvular lesion	5 cases
II. Marked narrowing of one or more main coronary arteries	9
a. With valvular lesion of aortic stenosis	3 cases
b. With arterial hypertension	6 cases

* Complete old occlusions of all three main coronary arteries were present in three cases, of two main coronary arteries in seventeen cases and of one coronary artery in nine cases.

TABLE 2.—*Cases of Congestive Failure with Angina Pectoris as Incidental Symptom; Nine Cases*

I. Combined coronary sclerosis and valvular lesions	2 cases *
II. Valvular lesions without coronary sclerosis	6 cases
III. Cor pulmonale without coronary sclerosis	1 case

* Coronary sclerosis consisted of narrowing of one main coronary artery in one case and occlusion of one primary branch in the second case.

that the obstruction to blood flow could be compensated by the opening of collateral channels. Although serious damage is generally avoided by the development of such collateral circulation, the margin of safety or, as it may be termed, "coronary reserve" is presumably reduced. The caliber of the coronary pathways, while sufficient to supply the usual needs of the myocardium, may not be sufficient to meet extraordinary conditions imposed by fresh arterial occlusion, increased cardiac work or lowered blood pressure as in shock.

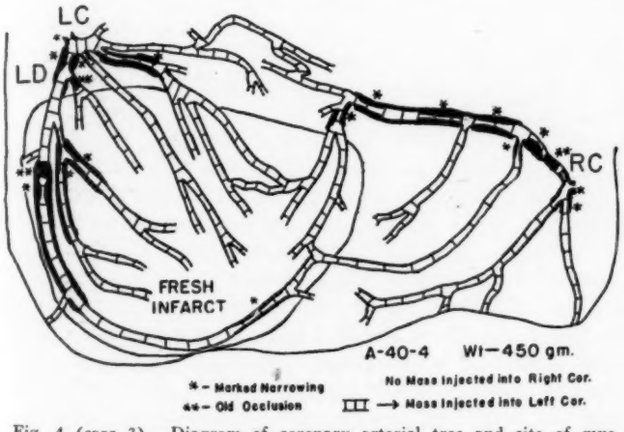

Fig. 4 (case 3).—Diagram of coronary arterial tree and site of myocardial infarct. Unilateral injection of lead agar mass into left coronary artery because of complete occlusion of right coronary artery.

To summarize, complete occlusion or narrowing of one or more major coronary arteries and their primary branches is found in the hearts of a considerable number of individuals without having given rise to cardiovascular signs or symptoms. Complete occlusion of one or more major coronary arteries is compatible with comfort and longevity. The function of the obstructed vessel is maintained satisfactorily by collateral pathways.

OBSERVATIONS IN CASES OF ANGINA PECTORIS

Following coronary occlusion the presence or absence of clinical signs and symptoms and the occurrence of myocardial damage depend on whether the development of the collateral circulation has kept pace with the progressive arterial narrowing. Our observations in cases of angina pectoris are in accord with the theory that cardiac pain develops when the coronary blood flow, while sufficient for the ordinary needs of the patient, is inadequate for the increased requirements of exercise, emotion and so on.

In the entire series of 355 cases there were forty-seven instances of angina pectoris (tables 1 and 2). In every case, examination of the clinical and pathologic data suggested the existence of relative insufficiency of the coronary circulation. This coronary insufficiency or reduced "coronary reserve" may be produced by factors which decrease the supply of blood or by factors which increase the myocardial requirements. The chief factor decreasing the blood supply is mechanical obstruction to blood flow by arteriosclerotic narrowing or occlusion. The collateral circulation enables the heart despite coronary obstructions to meet ordinary requirements but not the increased needs attendant to emotion or exertion. Among the chief factors which increase the work of the heart, and consequently increase its nutritional requirements, are valvular disease and arterial hypertension.

In accord with these considerations, we have divided all the patients in this series who experienced angina

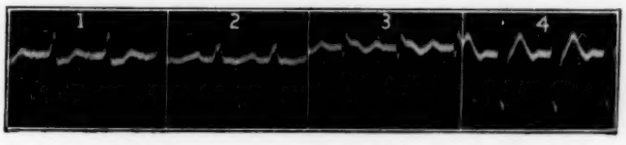

Fig. 5 (case 4).—Electrocardiogram taken four days before death.

pectoris into two groups. The first group of cases consists of those in which angina pectoris was the primary cardiac symptom (table 1). The second group comprises those patients in whom angina pectoris was present but was an incidental symptom, as the main cause of incapacity was congestive failure due, usually, to valvular heart disease (table 2).

Cases in Which Angina Pectoris Was the Primary Cardiac Symptom (table 1).—Old coronary arterial occlusions or narrowings of one or more of the main coronary arteries were found in each of the thirty-eight cases in which angina pectoris was the primary cardiac symptom. In the correlation of the coronary changes with the signs and symptoms of angina pectoris, fresh occlusions were not included in the foregoing analyses, for angina pectoris had been present prior to the occurrence of these terminal occlusions.

The numerous occlusions and narrowings observed in the hearts of this group are in striking contrast to the observations in the other hearts of the entire series. In each of these thirty-eight cases of angina pectoris the maximal blood supply originally available to the myocardium had been obviously reduced by arterial obstruction. Cardiac pain, presumably due to ischemia, developed under conditions which further reduced the available blood supply or increased the nutritional requirements of the heart. It is significant that, in the nine hearts in which coronary obstruction was somewhat

less extensive, other factors causing increased cardiac work were operative.

These anatomic observations provide an adequate structural basis for the operation of those physiologic factors which form the basis of the anoxemic theory of angina pectoris.[7] In patients, previously well, who suddenly suffer attacks of mild or severe angina pectoris on but little exertion, the occurrence of progressive narrowing or complete occlusion of a coronary artery must be considered. A similar interpretation must be entertained in patients with long standing angina pectoris if attacks are suddenly more readily precipitated. Under such circumstances bed rest is strongly advisable to decrease the demands on the heart and to permit sufficient time for the development of more adequate collateral circulation.

Cases in Which Angina Pectoris Was an Incidental Symptom in the Presence of Congestive Failure (table 2).—In nine cases of the entire series of 355, angina pectoris was an incidental feature of the illness which was characterized mainly by the presence of congestive failure. Eight of these cases showed extreme degrees of valvular stenosis or insufficiency; the remaining case was one of cor pulmonale. In two of the cases of this group, arterial narrowings or occlusions also were found which undoubtedly tended to lower the capacity of the heart to accomplish the necessarily increased work.

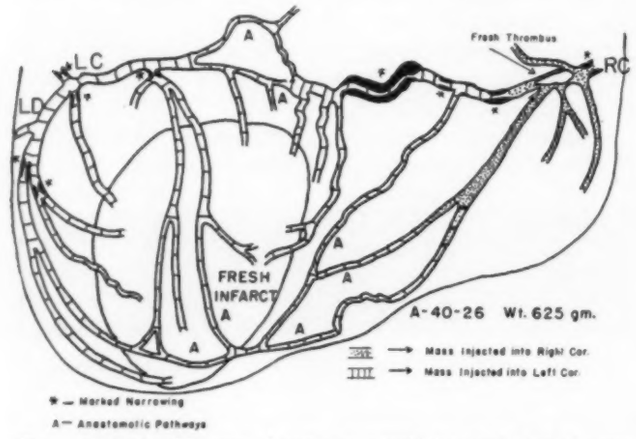

Fig. 6 (case 4).—Diagram of coronary arterial tree and sites of acute myocardial infarction and fresh thrombus.

The General Relation Between the Incidence of Coronary Occlusions and Angina Pectoris (table 3).—The incidence of occlusions has been examined in the following four groups of cases: (1) cases without angina pectoris, (2) cases with angina pectoris in which valvular disease was present, (3) cases with angina pectoris and associated arterial hypertension and (4) angina pectoris without valvular disease or hypertension (table 3). All hearts in which complete occlusion of any coronary artery was found are included in this table; eighty-six hearts conformed to this criterion. In these four groups the incidence of occlusions per heart rises progressively as factors other than arterial occlusions are eliminated from the etiology of the angina pectoris. It is to be emphasized that, while there is a general relationship between the incidence of coronary occlusions and the occurrence of angina pectoris, other modifying factors such as the site of the occlusion, the importance of the vessel involved,[8] the adequacy of the collateral circulation, the rate at which such occlusions or narrowings develop and the influence of reflex and other physiologic changes such as spasm and the effects of emotion are also of great importance.

To summarize, every patient suffering primarily from angina pectoris without evidence of valvular disease or arterial hypertension has shown old complete occlusion of at least one major coronary artery at postmortem examination; in the majority of instances, old complete occlusions of at least two of the three main coronary arteries were found.

THE CLINICAL DIAGNOSIS OF CORONARY FAILURE

In certain cases of this series, cardiac pain more prolonged than that consistent with angina pectoris has been noted, but the clinical evidences of myocardial necrosis, such as fever, leukocytosis, increased sedimentation rate or progressive electrocardiographic changes over a period of days, were not observed. At postmortem the hearts did not show acute myocardial infarction. In accord with the concept that cardiac pain is due to relative myocardial ischemia, such attacks occasionally were coincident with increased demands on the heart, such as paroxysmal heart action, emotion or exertion, whereas in other instances decreased coronary blood flow following fall of blood pressure in shock was apparently responsible. Since these episodes are more prolonged than those of angina pectoris and, on the other hand, the signs of myocardial necrosis are absent, the clinical diagnosis of either angina pectoris or of acute myocardial infarction would be erroneous. These attacks are more accurately described as attacks of "coronary failure." If the "coronary failure" occurs under circumstances which have not previously provoked attacks, the clinical diagnosis of "coronary failure due to acute coronary occlusion" is justifiable. The exact pathologic mechanism of occlusion, i. e. atherosclerosis, thrombosis, ulceration of atheromatous plaques, subintimal hemorrhage or edema, and embolism, is beyond determination by clinical means. Since some cases of coronary failure are followed, after an interval of some hours or days, by an attack of acute myocardial infarction, such patients should be treated conservatively by bed rest for a week or more. This possible sequence of clinical events is the same as that described by Feil[9] and designated by him as "preliminary pain." Similarly, Sampson and Eliaser,[10] on the basis of observations on a series of cases, state that "A single spontaneous attack of prolonged anginal pain strongly suggests the approach of a typical coronary thrombosis."

To summarize, these episodes of "coronary failure" differ from angina pectoris in the longer duration of the attack and in some instances in the altered characteristics of the pain. Both coronary failure and angina pectoris have the same physiologic basis in reversible myocardial ischemia of shorter or longer duration. The terms "coronary occlusion" or "coronary thrombosis,"

7. Parry, C. H.: An Inquiry into the Symptoms and Causes of the Syncope Anginosa, Commonly Called Angina Pectoris, Bath, R. Cruttwell, 1799. Keefer, C. S., and Resnik, W. H.: Angina Pectoris: A Syndrome Caused by Anoxemia of the Myocardium, Arch. Int. Med. **41**: 769 (June) 1928. Rothschild, M. A., and Kissin, Milton: Production of the Anginal Syndrome by Induced General Anoxemia, Am. Heart J. **8**: 729 (Aug.) 1933. Riseman, J. E. F., and Brown, M. G.: The Effect of Oxygen on the Exercise Tolerance of Patients with Angina Pectoris, Am. Heart J. **18**: 150 (Aug.) 1939. Smith, F. M.; Rathe, H. W., and Paul, W. D.: Observations on the Clinical Course of Coronary Artery Disease, J. A. M. A. **105**: 2 (July 6) 1935.

8. Schlesinger, M. J.: Relation of Anatomic Pattern to Pathologic Conditions of Coronary Arteries, Arch. Path. **30**: 403 (July) 1940.

9. Feil, Harold: Preliminary Pain in Coronary Thrombosis, Am. J. M. Sc. **193**: 42 (Jan.) 1937.

10. Sampson, J. J., and Eliaser, M., Jr.: The Diagnosis of Impending Acute Coronary Artery Occlusion, Am. Heart J. **13**: 675 (June) 1937.

as they are usually employed clinically, actually refer to an entirely different pathologic event; namely, myocardial infarction.

THE DIAGNOSIS OF MYOCARDIAL INFARCTION

If "coronary failure" is sufficiently prolonged, myocardial infarction results. The clinical diagnosis of acute myocardial infarction is based on the existence of prolonged cardiac pain plus clinical evidences of myocardial necrosis. These consist of fever, leukocytosis, increased sedimentation rate and electrocardiographic changes progressing over a period of days. Acute myocardial infarction may occur without a concomitant fresh thrombosis; and, contrariwise, thrombosis of a major coronary artery may occur without causing acute myocardial infarction.[11] Case 3 is an example of an acute myocardial infarction in the absence of fresh coronary occlusion:

CASE 3.—*Angina pectoris for two years; terminal syndrome of "acute myocardial infarction."*

Complete old occlusions of main left anterior descending and right coronary arteries and primary branch of left anterior descending artery; multiple narrowings of coronary arteries; no recent occlusions; no old infarction; massive fresh infarction of left ventricle.

Necropsy revealed the condition of the coronary arteries to be as shown in figure 4.

TABLE 3.—*Relation Between Incidence of Occlusions and Angina Pectoris*

Hearts with Occlusions	Number of Cases	Total Number of Occlusions	Aver. Number of Occlusions per Heart
Occlusions but no angina pectoris	49	68	1.4
Angina pectoris with occlusions and valvular lesions	5	9	1.8
Angina pectoris with occlusions and arterial hypertension	19	39	2.1
Angina pectoris with occlusions only	13	45	3.5

In the remaining 269 cases without occlusions, angina pectoris was absent except in nine with valvular defects and one with cor pulmonale.

The myocardium showed marked scattered fibrosis but no area of healed infarction. There was fresh infarction of the entire left ventricle and septum.

This case illustrates the following phenomena:

1. The high incidence of complete old occlusions of the main coronary arteries in cases of uncomplicated angina pectoris.
2. The amazing effectiveness of the collateral circulation in compensating for obstruction to the coronary blood flow so that no old infarcts had been produced in this heart.
3. The occurrence of fresh infarction in the absence of fresh occlusions.

The collateral circulation compensated to remarkable degree for numerous narrowings and occlusions throughout the coronary tree. As in most hearts of patients in whom angina pectoris was the primary cardiac symptom, two main coronary arteries were occluded. In addition, the primary branch of the left anterior descending artery was occluded and there were multiple areas of narrowing of all the arteries including the primary branches.

The effectiveness of this collateral circulation in preventing severe cardiac damage is evidenced by the absence of any old infarction. It is also noteworthy that, prior to the terminal illness, the heart was able to meet the ordinary requirements of life, although the coronary reserve was limited. No signs of congestive failure had been present. As pointed out in a previous communication,[2] the temporary periods of ischemia and angina pectoris not infrequently leave fibrous scars and finally lead to congestive failure. The terminal episode of acute myocardial infarction was induced not by any fresh occlusion but by the increased demands of exercise during cold weather. Irreversible structural changes occurred leading to infarction of practically the entire left ventricle.

TABLE 4.—*Relation Between Acute Myocardial Infarction and Coronary Occlusions*

Number of Cases	Acute Myocardial Infarction at Necropsy	Fresh Coronary Occlusion
33	+	+
12 *	+	0

* All hearts showed old complete occlusions except one with only slight narrowing in a case of cerebral hemorrhage with prolonged shock and respiratory paralysis.

The clinical diagnosis of myocardial infarction caused by acute coronary occlusion would appear to be justified, however, when the sudden severe crushing pain and collapse with evidence of tissue necrosis occur under circumstances in which the work of the heart is not increased, i. e. during sleep or at rest or under conditions, such as walking, which impose no greater burden on the heart than the patient has regularly borne satisfactorily in the past.

In some instances of acute myocardial infarction caused by acute coronary occlusion the occlusion may be found distant from the infarct in a vessel serving as a source for the collateral circulation supplying that area. We have not uncommonly observed for example that, following the evidently gradual formation of an old complete occlusion of the left anterior descending artery, no myocardial infarct resulted. Subsequently, however, infarction of the anterior wall of the left ventricle was precipitated by a fresh occlusion in the right coronary artery which served as a source of collateral circulation to the left ventricle.

TABLE 5.—*Relation Between Old Occlusions and Myocardial Infarction* *

Number of Hearts with Old Occlusions	Old Myocardial Infarction	Acute Myocardial Infarction
15	+	0
11	0	+
26	0	0

* Hearts with additional fresh obstruction to coronary arteries are excluded from this table.

This seemingly paradoxical sequence of events may be termed "infarction at a distance" and has been noted by others.[12] An excellent example of this phenomenon is case 4:

CASE 4.—*Angina pectoris and arterial hypertension three months before death; substernal thyroid with hyperthyroidism and congestive failure three weeks before death; terminal episode of acute myocardial infarction (fig. 5).*

11. Saphir, Otto; Priest, W. S.; Hamburger, W. W., and Katz, L. N.: Coronary Arteriosclerosis, Coronary Thrombosis, and the Resulting Myocardial Changes: Evaluation of Their Respective Clinical Pictures Including Electrocardiographic Records, Based on Anatomical Findings, Am. Heart J. **10**: 567 (June) 1935. Friedberg, C. K., and Horn, Henry: Acute Myocardial Infarction Not Due to Coronary Artery Occlusion, J. A. M. A. **112**: 1675 (April 29) 1939. Wolferth.[13] Bean.[12]

12. Bean, W. B.: Infarction of the Heart: A Morphological and Clinical Appraisal of Three Hundred Cases, Am. Heart J. **14**: 684, 1937. Saphir, Priest, Hamburger and Katz.[11]

Fresh occluding thrombus near mouth of right coronary artery; multiple narrowings of coronary arteries; extensive collateral anastomotic circulation; acute myocardial infarction of left ventricle (fig. 6).

This case exemplifies:

1. The development of collateral arterial pathways in a heart with only narrowed arteries but no occlusions.

2. An instance of angina pectoris in which coronary insufficiency was produced by the increased demands on the heart due to arterial hypertension and hyperthyroidism in the presence of arterial narrowing.

3. Infarction at a distance.

Correlation of the electrocardiographic changes with the pathologic condition, while available only in a portion of the cases, is in accord with the observations of others in certain respects. Progressive electrocardiographic changes occurring over a period of days signify myocardial infarction. The pattern of the electrocardiographic changes conforms generally to the site of the infarction in the anterior or posterior portions of the left ventricle and bears no necessary relation whatever to the site of the coronary occlusion or indeed to the occurrence of a coronary occlusion.

THE CLINICAL USE OF THE TERMS "CORONARY THROMBOSIS" AND "CORONARY OCCLUSION"

The results of these studies indicate that the disparity between clinical diagnosis and the pathologic condition in the heart is largely due to the fact that the terms coronary thrombosis and coronary occlusion actually refer to a pathologic event which may give rise to various clinical syndromes or, indeed, to no clinical symptoms or signs. The present studies indicate that there is no characteristic syndrome necessarily associated with coronary arterial occlusion per se. In the past the terms "coronary thrombosis" and "coronary occlusion" have been used by many clinicians to denote acute myocardial infarction. Our observations as well as those by others [13] demonstrate, however, that acute myocardial infarction bears no necessary relation to the formation of thrombi or occlusions; either may occur in the absence of the other. In our series, twelve of forty-five hearts with acute myocardial infarction showed neither acute coronary thrombosis nor acute coronary occlusion (table 4). The use of the term "acute coronary occlusion" to designate the existence of acute myocardial infarction would have been inaccurate in these twelve, or 27 per cent of the cases of infarction; the term "acute coronary thrombosis" would have been inaccurate in 47 per cent. Conversely, twenty-six hearts showed old complete occlusion without any myocardial infarction (table 5). Eleven additional hearts had old occlusions and fresh myocardial infarction but no fresh occlusions; here again the terms "acute coronary thrombosis or occlusion" would have been incorrect.

The use of the terms angina pectoris, coronary failure or acute myocardial infarction to differentiate the various syndromes in which attacks of cardiac pain are witnessed is a modification of the terminology hitherto employed and conforms more accurately to the observed conditions found. Our data are in accord with the current belief that cardiac pain is a manifestation of myocardial ischemia. In all three of the aforementioned syndromes, i. e. angina pectoris, coronary failure and acute myocardial infarction, the underlying mechanism seems to be a relative disproportion between the demands of the heart for blood and the supply of blood through the coronary arteries. The changes in the myocardium resulting from this disproportion depend solely on the extent and duration of the relative ischemia, not on the manner by which they are produced. If the duration of ischemia, as in angina pectoris, is brief, no permanent myocardial damage may occur or only microscopic foci of necrosis and fibrosis may result.[14] Even with more prolonged attacks, as in coronary failure, if the demands on the myocardium are quickly reduced by rest and sedatives or the control of abnormal cardiac rhythm, no structural damage may result. Clinical as well as experimental evidence [15] is in accord with these considerations. In the instance of myocardial infarction the ischemia is of such prolonged duration that irreversible structural damage results, giving rise to the clinical signs of tissue destruction.

SUMMARY AND CONCLUSIONS

1. A detailed clinical and pathologic study of 355 consecutive cases examined post mortem has been made with particular reference to the role of coronary occlusions and the collateral circulation in angina pectoris, coronary failure and acute myocardial infarction.

2. In normal hearts intercoronary anastomoses larger than 40 microns are generally absent. Fine communications measuring less than 40 microns in diameter can be demonstrated by the injection of watery solutions but are probably of little functional significance in obviating the untoward effects of sudden coronary narrowing or occlusion.

3. Complete occlusion or considerable narrowing of one or more coronary arteries may exist without giving rise to any clinical signs or symptoms and without having produced myocardial damage.

4. The apparent inconsistency between the presence of long standing obstructive arterial lesions and the absence of significant pathologic or clinical evidence of myocardial damage was dispelled by the demonstration of a collateral circulation which served as a bypass in relation to the obstruction in each of these hearts.

5. Every patient suffering primarily from angina pectoris without evidence of valvular disease or arterial hypertension has shown old complete occlusion of at least one major coronary artery at postmortem examination; in the majority of instances at least two of the three main coronary arteries had been occluded before the terminal illness.

6. Attacks of cardiac pain more prolonged than those of angina pectoris but unattended by evidence of myocardial infarction are more accurately described as attacks of coronary failure.

7. A comparative study of the clinical characteristics of coronary thrombosis and those of myocardial infarction forces the conclusion that coronary thrombosis and occlusion, per se, do not necessarily produce any characteristic clinical manifestations. The syndrome usually called "coronary occlusion," which consists of prolonged substernal oppression or pain, a fall in blood

13. Wolferth, C. C.: Present Concepts of Acute Coronary Occlusion, J. A. M. A. **109**: 1769 (Nov. 27) 1937. Saphir, Priest, Hamburger and Katz.[11] Bean.[12]

14. Riseman, J. E. F., and Brown, M. G.: The Sedimentation Rate in Angina Pectoris and Coronary Thrombosis, Am. J. M. Sc. **194**: 392 (Oct.) 1937.

15. Blumgart, H. L.; Hoff, Hebbel E.; Landowne, Milton, and Schlesinger, M. J.: Experimental Studies on the Effect of Temporary Occlusion of Coronary Arteries in Producing Persistent Electrocardiographic Changes, Am. J. M. Sc. **194**: 493 (Oct.) 1937; Experimental Studies on the Effect of Temporary Occlusion of Coronary Arteries, Tr. A. Am. Physicians **52**: 210, 1937. Tennant, Robert, and Wiggers, C. J.: The Effect of Coronary Occlusion of Myocardial Contraction, Am. J. Physiol. **112**: 351 (June) 1935.

pressure, pallor and the other manifestations of shock, and is accompanied by electrocardiographic changes, fever, leukocytosis and an increased sedimentation rate, in reality signifies myocardial infarction and should be so termed.

8. In all three of the discussed syndromes, i. e. angina pectoris, coronary failure and acute myocardial infarction, the underlying mechanism seems to be a relative disproportion between the requirements of the heart for blood and the supply through the coronary arteries. The changes in the myocardium resulting from this disproportion depend solely on the extent and duration of the relative ischemia, not on the manner in which they are produced.

9. The absolute necessity for immediate and complete bed rest, sedation, reduction of excessively high cardiac rates and other measures designed to reduce the work of the heart in the presence of prolonged cardiac pain is emphasized as a means of limiting the extent of myocardial necrosis or even preventing its development. Such a regimen also affords an opportunity for the development of a more adequate collateral circulation.

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ABSTRACT OF DISCUSSION

DR. FRED M. SMITH, Iowa City: It has long been known that extensive collateral circulation may be present in the heart, particularly in the presence of arteriosclerosis of the coronary artery. Thus, effective communications may develop between two vessels when one is gradually obstructed. The work of Drs. Blumgart and Schlesinger and their co-workers emphasizes this feature and they are to be congratulated on the careful manner in which they investigated the problem. The development of collateral circulation is obviously a protective mechanism against the inroads on the circulation to the myocardium from the arteriosclerotic process. This accounts for the fact that the heart may be free from significant histologic changes even in the presence of the occlusion of one or more of the major coronary vessels. It may also explain the absence of symptoms or perhaps determine the character of the clinical manifestations. The function of the collateral circulation gives us an important insight into the treatment of the condition. If a means can be found by which the development of this feature can be promoted it will obviously represent a tremendous advance in the treatment.

DR. WILLIAM D. STROUD, Philadelphia: We have been talking for a long time about collateral circulation, but it has remained for Dr. Blumgart and his associates to demonstrate to us definitely that this process does develop in the heart. I think it should be a great comfort to know that the process of collateral circulation develops, since most of us, as physicians, are going to develop angina with coronary disease. Although this development of the collateral circulation goes on, we may be able to help it with xanthines. It is encouraging to know that this process does go on, and it should stimulate us to be encouraging to our patients. With every one reading newspapers nowadays and seeing that many people die with this condition, it is discouraging and, as physicians, we possibly tend to increase this discouragement by our apprehension.

DR. HERRMAN L. BLUMGART, Boston: The most striking finding in this work by the method of Dr. Schlesinger has been the high incidence of coronary occlusions. The abrupt onset of angina pectoris in a person previously well, the sudden onset of angina pectoris on but slight exertion, or a marked exacerbation in the intensity or frequency of attacks of angina pectoris is presumptive evidence of coronary occlusion or progressive narrowing, which has exceeded the rate of development of the collateral circulation. Such patients should be treated conservatively by bed rest or by reduction of effort, so that their lives will not be unnecessarily jeopardized and the more serious consequences of myocardial infarction may possibly be avoided.

CLINICAL EVALUATION OF DISABILITY IN PULMONARY DISEASES OF INDUSTRY

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The New York State Department of Labor has created a board of impartial consultants to review controversial claims for compensation due to pulmonary disability acquired in industry. As a member of this board it has been my experience that two major problems exist:

1. A patient presents pulmonary disease obviously related to a definite industrial hazard. Disability is claimed, and it must be decided whether the disease which is present is disabling.

2. A patient is obviously disabled, but the difficulty arises in determining whether his disability is related to his occupation.

The solution of these problems necessitates finding answers to the following questions:

1. What etiologic agents exist in industry which produce pulmonary damage?

2. How do these substances produce lung injury, and what are the anatomic results?

3. How can these pulmonary illnesses be recognized?

4. How do these illnesses produce pulmonary incapacity, and what reliable clinical and laboratory procedures are there for determining this disability?

ETIOLOGY

Pulmonary diseases of industry include all forms of pulmonary fibrosis and emphysema produced by exposure to dusts, fumes, vapors and gases. Besides the specific pneumoconioses such as silicosis and asbestosis, pulmonary fibrosis may be produced by a variety of other industrial hazards.

In the practical problem of compensation in industry the relationship of the pulmonary disease to a specific exposure may be reasonably established in two ways. Either the exposure directly produces the pulmonary fibrosis or it favors the development of chronic low grade inflammation which results in fibrosis. It is well established that the accumulation of even inert substances in the lung predisposes it to recurrent low grade infections.

Individual susceptibility is an important factor, as evidenced by the experience that under identical conditions of exposure the extent and character of the lesions vary from one person to another, as well as the disability associated with apparently similar lesions. The constitutional factor, age, previous infections and nonindustrial dust exposure are important in determining individual reactions.

Constitutional Factor.—This has an important but poorly understood role. Just as individual factors exist in resistance to infection, so individual constitutional variants in the capacity of the lung to deal with foreign matter influence the reaction to hazardous exposure. One can only speculate on these factors. Variable ciliary action and circulatory flow probably contribute to the reaction.

From the New York Hospital and the Department of Medicine, Cornell University Medical College.
Read before the Section on Preventive and Industrial Medicine and Public Health at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

Age Factor.—Pulmonary efficiency diminishes with age; the diminution of it becomes manifest as emphysema. In some this comes only in senility, but, as with other degenerative processes, it may develop much earlier. Inelastic lungs are more susceptible to injury by foreign substances. In addition to the loss of elasticity with increasing age, there is a greater or lesser degree of associated fibrosis. This represents, no doubt, the cumulative effect of the two following elements:

1. Few people pass through life without repetitions of minor pulmonary incidents called colds, grip, influenza or bronchitis.

2. Furthermore, particularly in cities and industrial centers, constant inhalation in the general atmosphere of particulate matter, vapors and fumes of every description takes place.

These respiratory infections and this general dust exposure eventually provoke pulmonary changes. There exist only differences in degree, not in kind, between the so-called normal amount of pulmonary fibrosis so prevalent in the general population and those severe fibrotic processes which destroy the lungs of workers in industries wherein exposures exist to more concentrated and continuous effect of the same agents present in greater dilution in the atmosphere of industrial centers.

PATHOGENESIS

Prolonged exposure to pulmonary hazards produces morphologic changes in the lung which are an expression of the failure of the self-cleansing function of this organ. This function may be defined as the process by which foreign particulate substances and the products of inflammation (fluid as well as cellular) are eliminated from the air spaces. The active factors in this process are particular cells (alveolar phagocytes), lymphatic and blood circulations of the lungs and the ciliary apparatus of the air passages. This self-cleansing action is normally so efficient that it can clear, within a few hours, the air spaces of such huge exudates as may occur in lobar pneumonias. Its failure under conditions of industrial exposure results in accumulation of foreign matter in the air spaces. This provokes a chronic productive inflammation known as pulmonary fibrosis. There results a reduction in the available breathing space and in pulmonary elasticity. Progressive pulmonary emphysema is invariably associated with the development of the fibrosis. At first this emphysema is of compensatory character, but eventually it must become a source of decompensation, as overdistention of the already inelastic lung becomes irreversible.

A discussion of the morphology of fibrosis and emphysema is outside the scope of this presentation, but explanation of the following morphologic divisions will aid in understanding practical questions to be discussed later.

From the clinical and roentgenologic points of view, pulmonary fibrosis may be classified in the following forms: (1) massive (pneumonic subacute; this is seen in acute silicosis and after radium and roentgen ray exposures. Pathologically there is organized pneumonic exudate with recent cellular infiltration of monocytes and fibroblasts, (2) diffuse interstitial, (3) whorled nodular and (4) conglomerate (silicosis with infection and anthracosilicosis).

Diffuse interstitial fibrosis is seen in early silicosis. Both diffuse and nodular whorled fibrosis may terminate in the conglomerate type which has resulted in infection.

Emphysema associated with the various fibroses differs greatly both in degree and in nature. Fibrosis and emphysema rival each other, producing predominating structural changes. At times fibrosis predominates and at others emphysema is the conspicuous factor. Conglomerate fibrosis is more likely to give extensive emphysema. Bullae frequently are found bordering on fibrotic plaques. The massive pneumonic type of fibrosis is too rapid in evolution and too extensive to develop emphysema. Interstitial and nodular forms more likely produce diffuse generalized and compensatory emphysemas.

The first problem is estimation of disability in a patient with obvious pulmonary fibrosis related to his industry.

REPORT OF CASES

CASE 1.—E. B., aged 52, had been a construction and tunnel worker for eighteen years, he had been singularly free from illness, stating specifically that he never got colds and had not been laid up in bed since childhood. He complained of shortness of breath on climbing stairs or walking moderate distances such as five blocks. In addition he had a hacking cough which was productive of 10 cc. of mucoid sputum daily. Furthermore, he stated that he was not strong enough to handle a pneumatic drill and that this work provoked cough and shortness of breath. He claimed disability. What objective criteria can be used to establish this man's claim?

Physical examination disclosed a muscular, well nourished man whose accessory muscles were being used at a slightly increased rate of respiration. His chest was not barrel shaped, but there was definite limitation of thoracic cage motion. There was no cyanosis. The cardiac impulse was not palpable, and the heart sounds were distant, with an accentuated pulmonic second sound. The chest showed normal resonance above, hyperresonance below; fluoroscopic examination showed diminished diaphragmatic movement; there was no difference between inspiration and expiration. A roentgenogram showed emphysema below and a markedly increased retrocardiac space. The breath sounds were reduced in intensity but were vesicular in nature, and forced breathing failed to increase their intensity as it normally should. No rales were heard. A roentgenogram showed conglomeration and mottling. In this patient, who did not show extreme disability, there was, nevertheless, definite evidence on physical examination alone of reduced pulmonary capacity sufficient to explain his disability. This was a simple, clearcut case.

CASE 2.—Another man with a similar history of exposure, in whose roentgenograms conglomeration and mottling shadows but no obvious emphysema appeared, claimed disability because of shortness of breath and cough. Physical examination failed to show any definite evidence of pulmonary disability. His breathing was little changed and his chest excursion practically normal, as were his breath sounds and cardiac action. Fluoroscopic examination revealed good motion of the diaphragm, which was smooth in contour. There was no increase in the retrocardiac space, and the lungs did not appear overilluminated.

As neither physical examination nor fluoroscopic and roentgen ray studies were conclusive for determining disability in this patient, I had to use functional tests as accessory procedures.

Pulmonary function may be disturbed in three ways: (*a*) in ventilation, (*b*) in gas exchange and (*c*) in pulmonary circulation.

1. By ventilation is meant the ability of the lung to inflate and deflate with air. An increase of the residual and the tidal air takes place at the cost of the reserve air, leading thus to a progressive increase of the permanent air content of the lungs characteristic of pulmonary fibrosis associated with emphysema. This obviously interferes with the capacity of the lung to inflate and deflate. There results an increase in the minute volume of ventilation, while at the same time the maximal breathing capacity is reduced. Maximal breathing capacity is the total volume of air that can

be turned over during a minute's time by the deepest and most rapid respiration. It is calculated from the vital capacity and multiplied by the highest rate per minute the patient can actually accomplish.

2. With gas exchange tests one can measure spirometrically respectively the oxygen intake and carbon dioxide output. This is expressed in essentially three ways:

(*a*) Oxygen debt is the amount of excess oxygen the normal person needs at the end of exertion. It usually takes one to two minutes to recover the oxygen necessary to relieve dyspnea. Decompensation of the gas exchange mechanism is evident when the recovery period is longer than three minutes.

(*b*) Oxygen deficit is revealed by the excess intake of oxygen utilized when a patient shifts from air to oxygen inhalation. This is a sign of latent oxygen want which may be present at rest. It is found, despite full oxygen saturation of the blood, in pulmonary diseases bordering on decompensation.

(*c*) Oxygen unsaturation of the hemoglobin of the arterial blood, as determined by gas analysis, is found in disturbed gaseous exchange. Normally the oxygen saturation of arterial blood is about 95 per cent; saturation below 93 per cent indicates anoxemia, a sign of deficient oxygen supply. With a normal quantity of hemoglobin, this anoxemia indicates either interference with diffusion of gas in the lungs, poor ventilation or failing circulation. Artificially produced oxygen unsaturation is used as a test of functional deficiency (Whitehead et al.) by having the patient breathe a low oxygen mixture.

3. A third test of pulmonary function is that of measuring the efficiency of the pulmonary circulation. The simpler forms of such tests are determinations of the circulation time from arm to lung, and from arm to tongue and to carotid sinus by use of ether, dehydrochloric acid, sodium cyanide or calcium. This determines delay in circulation through the lungs. Intravenous infusion of 1,000 cc. of fluid followed by study of its effect on venous pressure and vital capacity reveals loss in reserve of the pulmonary vascular bed by the proportionate rise in venous pressure and decrease of vital capacity respectively.

The foregoing three functions, ventilation, gas exchange and pulmonary circulation, may be tested in combination under conditions of graded exercise. It has been found that for practical purposes the most suitable procedure is the so-called exercise tolerance test. The standard of exercise employed in this test is 30 steps per minute on a 20 cm. high pedestal. The patient exercises while connected with a spirometer which enables the examiner to measure the volume of air displayed per minute before, during and after exercise. The main purpose is to estimate the exercise capacity of the patient by this standard test, which is to find the point of exertion at which the patient registers inability to continue because of dyspnea.

The actual ventilatory volume measured at the dyspnea point, when related to the maximum breathing capacity of the patient (as calculated from vital capacity and maximal rate of breathing), affords information as to whether or not the patient is functionally handicapped.

A patient dyspneic on the aforementioned standard exercise, for which he needs 60 per cent or more of his maximal breathing capacity, is recognized as functionally handicapped. The amount of reserve remaining available in this standard exercise may be considered a crude measure of the patient's exercise capacity (where the reserve expresses the difference between maximal breathing capacity and actual minute volume of ventilation).

The normal person is comfortable with exercise requiring only 25 per cent of the maximal breathing capacity, uncomfortable on using 50 per cent and dyspneic on using above 60 per cent of maximal breathing capacity.

The exercise tolerance test is, then, essentially a measure of dyspnea. Clinically, dyspnea should be spoken of only when it is elicited by exertion employed in one's ordinary daily activities, such as moderate exercise. Under such conditions dyspnea indicates that the functional facilities no longer meet the ordinary demands without the patient's conscious effort at increased function. It should not be confused with hyperpnea, which is normally present on severe exertion.

Recent studies indicate that the nervous regulation of breathing is evidently much more sensitive than is the chemical. Most workers believe that the dyspnea of pulmonary disease is usually reflex in origin and in the forms of greatest clinical importance is associated with pulmonary congestion. Dyspnea might best be explained as a distress signal for the approaching limit of efficiency in coordination of ventilation, gas exchange and circulation. In this sense the point of dyspnea in exercise, when accurately determined, is perhaps the truest measure of a person's functional capacity.

In final analysis, then, evaluation of disability must be made by employing all available clinical data in conjunction with the simpler test of functional capacity. A single measuring stick, unfortunately, does not exist in the present state of our knowledge. When clinical data are inconclusive, the exercise tolerance test, as described previously, will at times give sufficient evidence of disability. At other times discrepancies exist, and opinion can be rendered only on the basis of one's clinical judgment.

DISABILITY GRADING

Disability should be graded according to the levels of functional compensation and decompensation, as explained. In conclusion the following classification, with its implications, is submitted for consideration as applying specifically to pulmonary diseases of industry:

Phase of Compensation.—Pulmonary fibrosis and emphysema are present to a considerable degree. They are apparent in visible distention of the lungs and demonstrable by roentgen examination, physical signs and spirometric tests. These indicate the presence of definite emphysema which, however, is still compensatory in character and does not as yet restrict functional capacity for moderate exercise. The vital capacity is reduced to more or less marked degree.

Latent Decompensation.—Fibrosis and emphysema apparent by all tests are of an extensive degree and, while tolerated during rest without producing symptoms, are associated with marked restriction of exercise capacity. Dyspnea is readily elicited on moderate exercise.

Manifest Decompensation.—Here the fibrosis and emphysema are of such degree as to be associated with more or less constant symptoms of functional insufficiency (dyspnea) even while the patient is at rest.

470 Park Avenue.

ABSTRACT OF DISCUSSION

DR. J. BURNS AMBERSON JR., New York: The point in Dr. Mayer's discussion which I should emphasize is his last statement that the estimation of a patient's disability after thorough study becomes largely a matter of clinical judgment. Physical and roentgen examination, of course, may disclose the extent and nature of the lesions, but impairment of function may be relatively slight even though the lungs are widely involved. What I refer to particularly is the distinction between nodular fibrosis of the lung such as one sees in silicosis, in which the functional disability may be relatively slight, and strictly interstitial fibrosis, which may be demonstrated with difficulty in the roentgenogram but, possibly because of the compromise of the capillary bead, may give rise to severe respiratory disability. The constitutional and physiologic factors which enter into disability after exposure to dust, for instance, are important; among these are to be considered the efficiency of the filtering mechanism of the nose and the disposition to such complications as sinusitis. There is some evidence that miners who suffer from sinusitis or come from families in which there is prevalence of respiratory infections seem to develop disability sooner than others. Estimation of respiratory dysfunction, as Dr. Mayer has indicated, is rather complicated and elaborate and certainly has to be subjected to clinical interpretation. Consideration should be given the man's estimate of what he can tolerate under working conditions. One has to think not only of mechanical functional disability but also of the possible threat of infection, present or future. As Dr. Mayer emphasized, a patient with pulmonary fibrosis and emphysema tolerates any pulmonary infection less well than the patient with normal lungs. This is particularly striking in the case of bronchopneumonia, in which relatively slight involvement causes often serious pulmonary decompensation. The threat or the actual effect of tuberculosis is always important to determine.

DR. EDGAR MAYER, New York: The aim of our studies now is to compare the value of clinical criteria of functional disability, as determined by physical signs, roentgen and fluoroscopic findings with that of the simpler functional tests. We are also aiming to compare on large enough scale Peabody's formula for predicting the value of maximal effective volume of breathing with the exercise tolerance and maximum breathing capacity test.

ADRENAL CORTEX EXTRACT IN THE TREATMENT OF BROMIDE ERUPTION AND BROMIDE INTOXICATION

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Our purpose in this paper is to report the effect of adrenal cortex extract [1] on the elimination of bromide and bromide effects, with special reference to bromide eruption and bromide intoxication. This report is based on our experience and the evidence accumulated from the treatment of five cases of bromide eruption and nine cases of bromide intoxication. Also we give the results of the study of ten cases of bromism which we had the opportunity of observing in epileptic patients at the Central State Hospital.

A short review of the pharmacology of bromides reveals that Bolgar [2] in 1910 found that bromides were readily absorbed from mucous membranes and that in ligated intestinal segments the absorption of bromide was not delayed by the presence of chloride; but bromide delayed chloride absorption. There are a variety of opinions present in the literature dealing with the distribution of bromide between the blood and various body fluids and tissues following its absorption. It has been reported that the distribution ratio between the bromides in the red blood cells and the serum is lower,[3] the same as [4] and higher [5] than the corresponding chloride ratio. Likewise, research opinions are at variance on the bromide-chloride content of various tissues. Two extensive and excellent independent studies, however, were carried out by Weir and Hastings [6] and by Wallace and Brodie [7] on the bromide-chloride distribution in various tissues; they agreed that, after oral and intravenous administration, the wet tissue serum ratios of bromide and chloride were in close agreement for all tissues except the brain and spinal fluid, and they further agreed that bromide has been found to replace chloride throughout the body tissues and fluids except for the brain and spinal fluid. In our work the blood bromide content has been taken as an index of progress in bromide elimination. As early as 1894 this replacement theory was suggested by Nencki and Schoumow-Simonowsky,[8] who found that those organs which normally contain the largest amounts of chloride also contain the largest amounts of bromide, and as the bromides increased the chlorides decreased. This work has been both confirmed and denied. Tachau [9] found that the bromide was excreted mainly in the urine; it has been claimed by Hastings, Harkins and Liu [10] and denied by von Frey [11] that the kidneys preferentially excrete chloride over bromide. Wyss [12] found that urinary excretion of bromide starts promptly after administration but proceeds slowly and that there is a disturbed ratio between the amount of bromide given and that excreted. Herzfeld-Gormidor [13] found bromide excreted in a ratio to the amount given, but always with retention, and noted traces of bromide in the urine as long as twenty days after administration was stopped. Wyss [12] and Herzfeld-Gormidor [13] were in accord in their conclusion that the administration of chloride hastened the elimination of bromide and, conversely, that the administration of bromide increased the elimination of chloride. In 1922, and more conclusively in 1923, Wile and his co-workers,[14] first suggested the chloride therapy of bromide eruption and laid the foundation for much future work.

Until recently Addison's disease, which basically is a degeneration of the adrenal glands, has been treated mainly by the oral and intravenous administration of large amounts of sodium chloride. More recently this chloride therapy has been fortified by the intramuscular injection of solutions of adrenal cortex; this addition to the older therapy has had exceptional success. The

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11. von Frey, E.: Ztschr. f. exper. Path. u. Therap. **8:** 29, 1910.

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13. Herzfeld-Gormidor, C.: Zentralbl. f. Biochem. u. Biophys. **13:** 790, 1912.

14. Wile, U. J.; Wright, C. S., and Smith, N. R.: A Preliminary Study of the Experimental Aspects of Iodid and Bromid Exanthems, Arch. Dermat. & Syph. **6:** 529 (Nov.) 1922. Wile, U. J.: Further Contributions to the Experimental Aspects of Iodid and Bromid Exanthems, ibid. **8:** 407 (Sept.) 1923.

depleted chloride content of the system can be maintained at physiologic levels and the patients are seen to recover almost to a normal state. In the older literature considerable discussion was centered on the relation between the adrenals and the metabolism of sodium, potassium and chloride; more recently Loeb and his associates [15] and Harrop and his associates [16] agreed that a regulatory effect on sodium and chloride metabolism is one of the functions of the adrenal cortex. In the last three years a great deal of work has been done in this form of treatment of Addison's disease; Loeb,[17] Thorn,[18] Thompson,[19] Harrop,[20] Cutler [21] and Hartman [22] are in agreement that the administration of adrenal cortex extract forces a definite retention of sodium chloride. Since it is apparent that bromide is retained in the system at the expense of chloride, adrenal cortex extract was given in the treatment of bromide retention in the cases reported here and the results are recorded.

The toxic level of serum bromide is a variable factor with reference to the individual case and until recently has not been well understood. An excellent study on this phase of bromide retention was published by Gundry [23] in which he presents detailed information on fifteen cases of bromide intoxication. In his article he gives a correlation between the level of the bromide content in the serum and mental symptoms. He indicated that, when the serum bromide reached from 150 to 250 mg. per hundred cubic centimeters of serum, mental symptoms appeared. In the management of his cases he used sodium chloride alone, from 4 to 10 Gm. daily for an average of two weeks, after which time the serum bromide level ranged from 85 to 244 mg. per hundred cubic centimeters and mental symptoms ranged accordingly.

TABLE 1.—*Cases of Bromide Intoxication*

Case	Condition on Admission	Serum Bromide on Admission, Mg.	Sodium Chloride Given, Gm. Daily	Adrenal Cortex Extract Given	Subsequent Serum Bromide, Mg.	Days After Admission	Condition at That Time
1	Severe bromide intoxication.....	400	8-10	None	200	18	Still confused
2	Mild intoxication.....	150	6	5 cc. per day	50	2	Relieved of bromide intoxication
3	Severe bromide intoxication.....	360	6-10	5 cc. per day	115	4	Normal
4	Severe bromide psychosis.....	300	6-10	None	157	12	Still confused
		300	6-10	5 cc. per day	63	14	Practically normal
5	Severe bromide psychosis.....	350	8-10	5 cc. per day	80	4	Relieved of bromide intoxication; epilepsy
6	Moderate intoxication.....	200	6-10	5 cc. per day	60	2	Relieved of bromide intoxication; involutional psychosis
7	Severe intoxication with dementia paralytica	165	8-10	5 cc. per day	105	1	Relieved of bromide intoxication
8	Severe intoxication.....	250	8-10	5 cc. per day	100	4	Normal
9	Severe intoxication.....	300	8-10	5 cc. per day	75	5	Normal

TABLE 2.—*Cases of Bromism in Epilepsy Artificially Produced*

Case		4/1/40	4/4/40	4/9/40	4/16/40	4/20/40	Treatment Started 4/21/40	4/22/40	4/23/40	4/24/40	4/26/40	4/27/40	5/1/40	5/4/40	5/7/40	5/10/40	Total Bromide, Grains
	Treatment Given—Sodium Chloride and Adrenal Cortex Extract																
1	Chloride.....	501.6	481.4	426.0	338.0	247.0	239.2	212.6	237.4	264.2	291.2	302.0	332.4	401.8	463.4	502.2	
	Bromide.....	13.02	144.0	220.0	236.0	244.0	254.0	188.0	270.0	190.0	120.0	94.0	62.0	40.0	22.0	8.0	2,400
2	Chloride.....	693.2	660.3	620.4	421.0	242.6		158.0	204.1	312.5	321.0	360.0	424.8	439.1	463.6	482.1	
	Bromide.....	20.5	81.4	210.0	228.0	253.0		245.0	173.0	154.0	102.0	78.0	40.0	12.0	3.0	1.8	2,280
3	Chloride.....	198.4	190.7	185.0	139.3	102.1		207.1	236.0	266.7	268.1	267.0	279.3	301.8	332.3	401.0	
	Bromide.....	22.5	62.5	183.0	250.0	374.0		274.0	150.0	96.0	75.0	68.0	37.0	15.2	10.3	6.2	2,280
4	Chloride.....	202.9	184.7	183.4	132.0	121.6	103.4			97.0		88.3	117.6	221.4	315.0	337.6	
	Bromide.....	12.0	37.0	74.0	83.0	104.0	170.0			198.0		257.0	164.0	55.0	40.5	27.0	2,340
	Treatment Given—Chloride Alone																
5	Chloride.....	518.1	502.4	436.0	300.7	160.4		351.0	379.2	420.0	446.8	449.0	496.3	532.0	587.0	592.4	
	Bromide.....	18.02	54.0	127.0	216.0	327.0		272.0	268.0	204.0	162.0	160.0	150.0	145.0	130.0	126.0	2,280
6	Chloride.....	495.2	443.8	424.7	301.0	132.4		215.4	301.7	387.2	389.4	378.0	389.9	392.6	393.1	396.8	
	Bromide.....	24.40	96.7	280.0	286.7	296.0		278.0	275.0	252.0	246.0	220.0	196.0	174.0	145.0	140.0	2,280
7	Chloride.....	421.3	401.2	400.4	316.7	243.0	204.3			188.0		186.1	199.3	208.8	216.0	288.2	
	Bromide.....	9.02	46.0	83.0	117.0	139.0	210.0			231.0		263.0	194.8	175.0	160.0	130.0	2,340

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The nine cases of bromide intoxication which we report in table 1 were seen in the Campbell Clinic and are reported after hospital observation. In two of these cases treatment was by chloride alone and in seven adrenal cortex extract was given in conjunction with the chlorides. Dosage was the amount indicated in table 1. The two cases in which chloride was given alone make an interesting comparison to the other seven of this group. Their average duration of mental symptoms was more than fifteen days. The average of the other seven cases was five and one-half days.

Fig. 1 (case 5).—Bromide eruption in traumatized area on leg scratched by wire.

The five cases involving the skin reported here are from our private files and from the University Hospital service.

REPORT OF CASES

CASE 1.—A white woman aged 39, seen first June 4, 1939, gave a history of prolonged nervousness and of having taken bromides intermittently over a period of years. Two months previous to the appearance of the lesions on her legs she had taken large doses of bromide constantly, approximately from 60 to 100 grains (4 to 6.5 Gm.) daily. The lesion first appeared on the posterior aspect of her lower leg as a small papule and gradually enlarged to form an irregular oval lesion 3 cm. in diameter. The surface was raised, papilliform and fungating, with many small abscesses visible. The surrounding skin was red, swollen and painful. The laboratory examinations were essentially negative except for the blood bromide level, which was 85 mg. per hundred cubic centimeters of serum. Treatment was the daily administration of 200 cc. of physiologic solution of sodium chloride intravenously and 3 Gm. of sodium chloride by mouth with the intramuscular injection of 2.5 cc. twice daily of adrenal cortex extract. This treatment was continued for six days. On the second day the bromide level of the blood was 66 mg., the third day 37 mg. and the sixth day 15 mg. per hundred cubic centimeters of serum. The lesions were more painful the second and third days and were treated locally by wet dressings. The healing was noticeable at the end of the first week and the lesion was entirely healed, to leave a hyperemic scar, at the end of the fifth week.

CASE 2.—A white woman aged 42, seen first Aug. 11, 1939, gave the usual history of bromide medication over a long period, most of this being in the form of "patent medicines." The eruption was primary on her leg and was typical of bromide eruption—painful, raised and with the usual cribriform surface. The surrounding skin was irritated by local medication. Her blood bromide level was 97 mg. per hundred cubic centimeters. She was given six days of treatment consisting of 5 cc. of adrenal cortex extract intramuscularly, 200 cc. of physiologic solution of sodium chloride intravenously and 5 Gm. of sodium chloride by mouth each day. On the third day her blood bromide level was 68 mg. and on the fifth day it was 20 mg. per hundred cubic centimeters of serum. Saline packs were applied locally. The lesion progressed to almost complete healing at the end of the fourth week, after which time the patient failed to return for observation.

CASE 3.—A boy aged 12 years with epilepsy had been treated by an Indian doctor and had received enormous doses of bromide, estimated at 300 grains (20 Gm.) a day. The child presented a lesion on his left leg approximately 8 inches long and from 2 to 3 inches wide. There were several places of marked activity typical of bromide eruption which were separated by scarring from previous lesions. The process had been present many months. Secondary infection was apparent. The blood bromide level was 223 mg. per hundred cubic centimeters. Other laboratory studies were negative. His treatment consisted of 8 Gm. of sodium chloride by mouth, sodium bicarbonate 1 drachm (4 Gm.) and adrenal cortex extract 5 cc. intramuscularly daily. This was continued for seven days. There were no other sedatives given and the child had one seizure during his hospital stay. The lesions were treated locally with wet packs. The healing process was apparent at the end of the first week and this had progressed almost to a smooth scarred but hyperemic area when he was discharged from the hospital at the end of the fourth week. The blood bromide level on discharge was 26 mg.

CASE 4.—A white man aged 37, a stock broker, had a papular eruption about his face, forehead and shoulders which had been present for three weeks. The lesions were brown, crusted and painful. He was nervous and addicted to drinking from two to five effervescent bromides daily. His blood bromide level was 62 mg. per hundred cubic centimeters of serum. He was given 5 Gm. of sodium chloride by mouth and 3 cc. of adrenal cortex extract intramuscularly daily for four days. His skin was healed at the end of the third week.

CASE 5.—A white woman aged 29 had consulted me five years previously to the present admission with a typical bromide eruption. She had changed her family doctor and had been given bromide for her persistent nervousness for six weeks prior to seeing me. Her dosage had been approximately from 60 to 75 grains (4 to 5 Gm.) daily. About a week and a half after this medication was started she received two scratches on her left lower leg. One scratch was about 3 inches long, and the other about ¾ inch long. These scratches soon became swollen, raised and papilliform and contained minute abscesses typical of bromide eruption (fig. 1). Other papular lesions developed on her face and back (fig. 2). The activity on the ankle was confined to the injured area. Her blood bromide level was 137 mg. per hundred cubic centimeters. She was treated with 10 Gm. of sodium chloride by mouth, 1 Gm. of sodium bicarbonate, and 5 cc. of adrenal cortex extract daily for six days. On the second day her blood bromide

Fig. 2 (case 5).—Bromide eruption on face (blood serum bromide 137 mg. per hundred cubic centimeters).

level was 75 mg., the third day 60 mg., the fourth day 42 mg. and the twelfth day 18 mg. This lesion became more painful from the second to the fourth day. Healing was noticeable at the end of the second week, and the skin was smooth and apparently healed on the thirty-sixth day.

The ten persons observed with bromism were patients at the Central State Hospital and consisted of five selected women and five selected men with an average age of 27, all in apparently good general health except for their mental symptoms. Most of these patients had taken bromides on previous occasions but none had had any for two months. Three of the men were dropped from the list because of problems of management encountered in hospitals for the insane. Their cases were incomplete and were dropped from the report. An initial determination of the level of the bromide and chloride of the blood were done on all patients. All were then started on bromide alone, the dosage being from 60 to 120 grains (4 to 8 Gm.) daily, given in an effort to build up the bromide level of the blood. The retained bromides were seen to be in direct ratio to the amount given. When the serum bromides were reaching the toxic level the patients were divided, and three of the women were treated by being given chloride and adrenal cortex extract in conjunction, and two were treated by being given chloride alone. One of the men was given chloride and adrenal cortex extract, and the other chloride alone. This treatment consisted of 10 Gm. of sodium chloride by mouth and 5 cc. of adrenal cortex extract intramuscularly daily to four patients (three women and one man) and the others (two women and one man) received only 10 Gm. of sodium chloride daily. The patients receiving the chloride alone had treatment continued longer than the others, as indicated in table 2. Two of the women broke out with mild bromide eruptions. Of the three patients who took chloride alone, two developed a rather marked edema of the feet and ankles near the end of the course. They were given sodium bicarbonate and were relieved rather promptly. There was no evidence in any of these cases of any kidney irritation (table 2).

CONCLUSIONS

From the foregoing data we conclude that:

1. Adrenal cortex extract when given in combination with sodium chloride is apparently of value in the excretion of bromide and bromide effects.
2. Trauma has an influence in bromide eruptions.
3. Sodium bicarbonate is of apparent value in controlling the edema seen in extensive chloride therapy.
4. Adrenal cortex extract restores the normal physiologic level of chloride.

412 Medical Arts Building.

ABSTRACT OF DISCUSSION

DR. EUGENE F. TRAUB, New York: I am delighted that the authors have presented a method of treatment that is such a distinct improvement in handling bromide eruptions. Undoubtedly this can be utilized in managing iodide eruptions as well. The authors must be doubly congratulated that they were the first to recognize the value of adrenal cortex extract for the prompt and effective relief of bromodermas. The administration of sodium chloride to subjects with Addison's disease has always exerted a beneficial effect, but since the development of adrenal cortex therapy our approach has been altered and we now have a much improved method of treatment. I believe that this paper paves the way for several problems which the authors should continue to carry on. First, I would suggest that, instead of stopping the bromides at a certain point, as they did in their experiment, they continue with the use of bromides and further note the effect of adrenal cortex extract on a patient who is continuing both treatments. It is barely possible that the use of adrenal cortex extract may make it possible for us to give much larger and more effective doses of both bromides and iodides without harmful effect. The second problem that they might attempt would be to study the effect of adrenal cortex extract alone without the use of sodium chloride. As a check on this they might study the effect of using sodium chloride while giving bromides. And, as a further check, they might observe the effect of using no medication and note the rate of return of the blood levels to normal. The authors also found that in their cases there was no kidney irritation. This may have been due to the fact that they were studying healthy young subjects, or it may be possible that the failure to note kidney irritation may have been due to the use of adrenal cortex extract. I believe that point should be investigated further.

DR. E. W. ABRAMOWITZ, New York: The neurologists are undecided as to which is more effective as a sedative, the barbiturates or the bromides. This paper is exceedingly appropriate in this regard. The finding of an increased amount of bromide in the serum and in the urine is of importance in the prevention of bromide intoxication. Anything above 75 mg. per hundred cubic centimeters of bromide in the serum may be a sign of impending trouble. However, there are persons in whom the bromides reach much higher levels and no signs of intolerance develop. This is particularly true of those who develop cutaneous eruptions. It is well known that there is only a small proportion of those with mental bromidism who present bromodermas. It is apparent, therefore, that there are other factors besides bromide retention in those with cutaneous eruptions. These factors are individual susceptibility and trauma, among others. I recently presented a patient before the Manhattan Dermatological Society (*Arch. Dermat. & Syph.* **40**:478 [Sept.] 1939) who, while getting insulin injections, was given some bromide to take and she promptly developed a bromoderma at the sites of the injections of insulin. It is known that a decompensated adrenal insufficiency is associated with a constant decrease in the concentration of sodium in the blood. This is accompanied by a corresponding drop in the chlorides. The use of sodium chloride instead of adrenal cortex extract may be more economical in controlling bromide retention in the body. Loeb (*Bull. New York Acad. Med.* **16**:347 [June] 1940) advocated the use of desoxycorticosterone esters 1 to 10 mg. daily in adrenal cortical insufficiency. This is a synthetic preparation said to be more active than adrenal cortex extract.

DR. RICHARD L. SUTTON JR., Kansas City, Mo.: The authors have hit on an ingenious method which does the job. Another way of reducing blood bromide concentration was suggested to me by Dr. Ralph Major, of the University of Kansas, who removes gastric juice which is normally rich in chloride and in brominism is rich in bromide. Continuous suction of gastric secretion, replacing chloride by intravenous drip, will reduce blood bromide concentration dramatically and perhaps lower it 50 per cent in twelve hours. As for the level in the blood which is associated with symptoms, not necessarily cutaneous but really mental intoxication, I have seen two physicians with chronic pruritic dermatoses in whom the bromide levels at onset of symptoms were only about 50 and 70 mg. per hundred cubic centimeters. I have become reluctant to prescribe bromides.

DR. C. P. BONDURANT, Oklahoma City: I want to express appreciation for the assistance of Drs. Brake and Prosser of the Central State Hospital for helping me carry out this work on these epileptic patients. Time will not allow us to discuss all the points brought up. I would call attention to the scratch mark in case 5, in which the bromide eruption appeared in the traumatized area. I think it was Ingram and Muck who in 1906 first called attention to the fact that trauma was a factor in the location of bromide eruptions. To my knowledge, this is the first picture which exemplifies rather conclusively this fact. I wanted to produce some scratch marks on these epileptic patients but met with objections which precluded this possibility. Dr. Traub points out further work which would more conclusively establish this principle of therapy in bromide retention. We intend to continue this work along many of the lines he discussed. I am not sure whether the adrenal cortex extract

was a factor in reducing kidney irritation in the epileptic patients studied. These patients were selected particularly because they were in good health, and previous hospital records showed no evidence of kidney irritation. The question of bromide levels in bromide intoxication and bromide eruption is a large subject. I believe there is a personal element which enters into each of these cases, with reference to this type of intoxication and eruption, and is the same as the personal element seen in other forms of intoxication from alcohol and other things.

THE EFFECTS OF INTRAVENOUS SOLUTIONS ON PATIENTS

WITH AND WITHOUT CARDIOVASCULAR DEFECTS

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The popularity of giving fluids intravenously is growing, and the benefits derived from them are generally well known. Through the investigations of many workers [1] the indications for the various solutions have been satisfactorily worked out, but the contraindications to their use, because of possible harmful side effects on the various systems of the body, have not been as well established. Clinical observations have convinced us that the use of fluids intravenously has been too promiscuous and has been responsible for serious complications.

In this study we have attempted to determine the effect of different fluids on tests of cardiovascular function, particularly with reference to the ability of the cardiovascular system to accommodate the added fluids. It was our hope to be able to establish a simple method of forecasting the tolerance of the cardiovascular system for intravenous fluids, but this hope was not fulfilled.

Elderly persons without heart disease and cardiac patients with and without heart failure were studied. Intravenous administration alone was employed because of its generally increased popularity, easy control, freedom from pain and certainty of introduction.

The observations included changes in the blood and plasma volume, red count, hematocrit, plasma protein, hemoglobin, pulse, blood pressure, respiration, venous pressure, arm to lung and arm to tongue circulation time, vital capacity, electrocardiograms and minute volume urinary output at fifteen to thirty minute intervals for one-half hour before, during and two to four hours thereafter. The patients were weighed at intervals before and after. To 10 noncardiac patients between 60 and 75 years of age with serious organic disease such as carcinoma and surgical gallbladder disease 1,000 cc. of fluid, either physiologic solution of sodium chloride or 5 per cent dextrose solution in water, were given intravenously at various rates of speed three times daily for a continuous period of three days. None of these patients were obviously dehydrated or had serious renal disease. Four hours prior to fluid administration and throughout the entire test period, enteral feeding was prohibited. To both the cardiac and noncardiac patients the fluids were given at rates which we found to be used in many hospitals in this country. As our purpose was to test the tolerance of the cardiovascular system to the rate and volume of fluid, therapeutic indications were not demanded nor were volumes assumed to be safe always employed. The fluids used, rate of injection and classification of the patients are indicated in table 1.

METHODS

The total blood and plasma volumes were calculated from the body surface area, plasma protein and hematocrits, by the method (method A) described by Gilligan and Altschule.[2] The total plasma protein was determined by the gravity method of Kagan [3] and checked frequently by refractometric methods and the method of Kjeldahl. These values were further checked by hemoglobin determinations with a Klett photoelectric colorimeter and red cell counts. The venous pressure was measured by the direct sodium citrate method with a B-D manometer. Ether was used in determining the arm to lung time by the technic described by Hitzig [4] and checked occasionally with paraldehyde.[5] Decholin (6 cc. of 20 per cent solution) was used in determining the arm to tongue time. For these three tests the arm was in a resting position at about a 60

TABLE 1.—*Type of Fluid, Volume, Rate of Injection per Minute and Cardiac Classification*

Fluid	Volume, Cc.	Rate per Minute, Cc.	Non-Cardiac	Cardiac 1&2	Cardiac 3	Cardiac 4	Total
Physiologic solution sodium chloride	1,000	25-35	64	12	..	1	77
Physiologic solution sodium chloride	2,000	35-45	2	1	..	..	3
5% dextrose in water	1,000	25-35	17	5	..	..	22
10% dextrose in water	1,000	20-35	2	5	6	4	17
20% dextrose in water	1,000	15-20	1	..	1	..	2
50% dextrose in water	200	10-20	..	3	5	6	14
50% dextrose, 8 grains of aminophylline	200	10-20	..	2	5	6	13
50% dextrose, 8 grains of aminophylline	50	10-20	1	2	2	6	11
			87	30	19	23	159

From the Marquette University School of Medicine, and Clinics, Milwaukee County Hospital.

Read before the joint meeting of the Section on Practice of Medicine and the Section on Pharmacology and Therapeutics at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. These investigations have been reported by:
Seibert, F. B.: Fever-Producing Substances Found in Some Distilled Waters, Am. J. Physiol. **67:** 90 (Dec.) 1923; Cause of Many Febrile Reactions Following Intravenous Injections, ibid. **71:** 621 (Feb.) 1925.
Hort, E. C., and Penfold, W. J.: The Dangers of Saline Injections, Brit. M. J. **2:** 1589, 1911; A Critical Study of Experimental Fever, Proc. Roy. Soc., London, s. B **85:** 174, 1912; Micro-Organisms and Their Relation to Fever, Proc. Path. Soc. Great Britain & Ireland **17:** 109, 1912-1913.
Bourn, J. M., and Seibert, F.: Cause of Many Febrile Reactions Following Intravenous Injections, Am. J. Physiol. **71:** 652 (Feb.) 1925.
Rademaker, Lee: The Cause and Elimination of Reactions After Intravenous Infusions, Ann. Surg. **92:** 195 (Aug.) 1930; Reactions After Intravenous Infusions: A Further Report on Their Elimination, Surg., Gynec. & Obst. **56:** 956 (May) 1933.
Elser, W. J., and Stillman, R. G.: The Fetish of Triply Distilled Water, J. A. M. A. **100:** 1326 (April 29) 1933.
Coller, F. A., and Maddock, W. G.: The Water Requirements of Surgical Patients, Ann. Surg. **98:** 952 (Nov.) 1933; A Study of Dehydration in Humans, ibid. **102:** 947 (Nov.) 1935.
Coller, F. A.; Dick, V. S., and Maddock, W. G.: Maintenance of Normal Water Exchange with Intravenous Fluids, J. A. M. A. **107:** 1522 (Nov. 7) 1936. Coller, F. A., and Maddock, W. G.: Water and Electrolyte Balance, Surg., Gynec. & Obst. **70:** 340 (Feb., no. 2A) 1940.

2. Gilligan, D. R.; Altschule, M. D., and Volk, M. D.: Effects on the Cardiovascular System of Fluids Administered Intravenously in Man: Studies of the Amount and Duration of Changes in Blood Volume, J. Clin. Investigation **17:** 7 (Jan.) 1938.

3. Kagan, B. M.: A Simple Method for the Estimation of Total Protein Content of Plasma and Serum: II. The Estimation of Total Protein Content of Human Plasma and Serum by the Use of the Falling Drop Method, J. Clin. Investigation **17:** 373 (July) 1938.

4. Hitzig, W. M.: Measurement of Circulation Time for Antecubital Veins to Pulmonary Capillaries, Proc. Soc. Exper. Biol. & Med. **31:** 935 (May) 1934.

5. Candel, Samuel: Determination of the Normal Circulation Time from the Antecubital Veins to the Pulmonary Capillaries by a New Technic, Ann. Int. Med. **12:** 236 (Aug.) 1938. Manchester, Benjamin: Measurement of Velocity of Blood Flow from Arm to Lung by Use of Paraldehyde (Preliminary Report), M. Ann. District of Columbia **8:** 49 (Feb.) 1939.

degree angle, the antecubital vein being 4 cm. below the fourth costosternal junction. The vital capacity was measured in cubic inches by means of a Simplex spirometer. The bladder was catheterized and urine collected at suitable intervals before, during and after fluid injection for calculation in cubic centimeters output per minute. The subjective and objective changes in the patients' condition were also noted.

RESULTS

Plasma Volume.—The average changes in total calculated plasma volume with the fluids in the different types of patients at stated intervals after injection are given in table 2. We may briefly summarize these changes by saying:

1. One thousand cc. of physiologic solution of sodium chloride or 5 per cent dextrose solution at 20 to 30 cc. per minute in noncardiac patients causes:

(*a*) An average increase in total calculated plasma volume of 310 cc. within the first one-half hour of starting fluids; that is, an increase of one-third the volume of fluid given.

(*b*) Increasing the rate of injection causes a parallel increase in total calculated plasma volume.

(*c*) Increasing the volume of solution causes an increase which is not in direct proportion.

(*d*) Within one-half hour, the increase in plasma volume falls one third. The rate of fall is directly proportional to the speed with which the physiologic solution of sodium chloride is given.

(*e*) At the end of four hours there is an increase of 200 cc. in total calculated plasma volume, or about one-fifth the volume of fluid administered, regardless of the rate. With 5 per cent dextrose solution the increase is only 100 cc., or one-tenth the volume of fluid administered.

2. With hypertonic solutions the changes are of the same character, but, while the original increase is greater in proportion to amount of fluid given, it is less in proportion to amount of solute, the rise is less sustained, and by the end of four hours the plasma volume is usually below control levels.

3. The addition of aminophylline greatly diminishes the initial increase or causes an actual initial decrease in total calculated plasma volume.

4. The greater the degree of cardiac decompensation, the less the initial increase in plasma volume.

5. Repeated administration of 1,000 cc. of physiologic solution of sodium chloride causes a gradual increase in plasma volume. This is obviated by the occasional use of 5 per cent dextrose solution interspersed with the physiologic solution of sodium chloride.

TABLE 2.—*Changes in the Plasma Volume Immediately After and One-Half, One, Two and Four Hours After the Various Fluids Given Intravenously to Cardiac and Noncardiac Patients*

Fluid	Number of Cases	Classification	Rate per Minute Cc.	Immediately After, Cc.	One-Half Hour, Cc.	One Hour, Cc.	Two Hours, Cc.	Four Hours, Cc.
1,000 cc. 5% dextrose in water	18	Noncardiac	20-30	+310	.....	.....	+100	+100
1,000 cc. physiologic solution sodium chloride	40	Noncardiac	20-30	+310	+220	+240	+245	+180
	39	Noncardiac	30-40	+440	+240	+330	+215	+185
2,000 cc. physiologic solution sodium chloride	3	Noncardiac	30-40	+630	+465	.....	+240	+200
200 cc. 50% dextrose in water	9	Groups 2 & 3 cardiac	10-15	+230	+ 20	+145	+ 90	— 60
	6	Group 4 cardiac	10	+185	+ 45	+ 45	+145	.....
200 cc. 50% dextrose, 8 grains of aminophylline	6	Groups 2 & 3 cardiac	10	+ 45	— 70	— 80	— 50	—205
	6	Group 4 cardiac	10	— 50	—255	—220	— 70	— 75
50 cc. 50% dextrose, 8 grains of aminophylline	4	Groups 2 & 3 cardiac	10	+ 30	— 50	—125	— 20	— 30
	6	Group 4 cardiac	10	+ 10	— 95	—115	— 85	— 60
1,000 cc. 10% dextrose in water	4	Noncardiac	20-25	+225	+ 25	.....	+ 25	+ 35
	7	Groups 1, 2 & 3 cardiac	20-25	+165	— 80	+ 15	+ 90	— 40
	4	Group 4 cardiac	10-20	+ 20	— 80	+ 40	+145	— 70
Total	152							

TABLE 3.—*Average Changes in the Venous Pressure Immediately After, One-Half, One, Two, and Four Hours After the Various Fluids Given Intravenously at the Stated Rates to Cardiac and Noncardiac Patients*

Fluids	Number of Cases	Patient's Class of Compensation	Rate in Cc. per Minute	Control, Mm. Water	During	Immediately After	One-Half Hour After	One Hour After	Two Hours After	Four Hours After
1,000 cc. 5% dextrose in water	20	Noncardiac	30-50	62	....	+20	....	....	+ 4	—10
1,000 cc. physiologic solution sodium chloride	33	Noncardiac	20-30	66	....	+24	0	— 2	+ 8	—16
	34	Noncardiac	30-40	48	....	+11	— 5	+ 2	....	0
2,000 cc. physiologic solution sodium chloride	3	Noncardiac	30-40	73	+40	+70	+20	....	+16	+35
200 cc. 50% dextrose in water	9	Groups 2 & 3 cardiac	7-15	96	....	+24	+11	+ 8	+ 2	+50
	6	Group 4 cardiac	7-15	180	....	+13	—18	— 9	—17	—20
200 cc. 50% dextrose, 8 grains aminophylline	5	Groups 2 & 3 cardiac	7-10	110	+31	+37	+ 6	+11	....	+ 5
	6	Group 4 cardiac	7-10	177	—11	— 2	—20	—24	— 8	+10
50 cc. 50% dextrose, 8 grains aminophylline	4	Groups 2 & 3 cardiac	5-10	115	—10	+ 6	+ 7	+ 4	....	— 8
	6	Group 4 cardiac	5-10	190	—20	—30	—44	—56	—60	—30
1,000 cc. 10% dextrose in water	4	Noncardiac	20-25	80	....	0	— 2	....	....	—15
	7	Groups 1, 2 & 3 cardiac	20-25	88	....	+30	+12	+ 7	....	+10
	4	Group 4 cardiac	10-20	145	....	+60	+14	0	....	+ 3
Total	141									

Blood Volume.—The total calculated blood volume changes with isotonic solutions approximated the plasma volume changes in pattern and kept the same approximate relationship throughout. With hypertonic solutions the changes were highly inaccurate, owing in part to actual shrinkage of the red cell size leading to inaccurate hematocrit readings for the calculations. Blood volume is not reported for this reason.

Venous Pressure.—Changes in venous pressure for the same groups are given in table 3. We may summarize these changes by saying:

1. The venous pressure changes in general parallel the plasma volume changes.

2. In general, the higher the initial venous pressure, the less pronounced the rise after fluid administration.

3. The onset of acute failure of the left side of the heart was not always associated with a change in venous pressure. Two of four patients going into acute left ventricular failure showed a slight decrease in venous pressure while in acute failure.

4. The venous pressure never rose to pathologic levels (over 120 mm. of water) unless failure was present or occurred during administration of fluid.

5. The initial increase with physiologic solution of sodium chloride and hypertonic dextrose solution, previously noted by several other workers,[6] persisted for from forty to sixty minutes and was then followed by a fall in venous pressure, usually without regard to the continued administration of fluids.

6. Only in solutions with aminophylline was there an initial decrease in venous pressure. This has been reported by Greene, Paul and Feller.[7]

7. There was no difference in the character of venous pressure response between valvular and nonvalvular heart disease, or between patients with compensated heart disease and normal persons except for differences in height.

Circulation Time.—In 34 noncardiac persons the initial decholin time ranged from 11.8 seconds to 30.2 seconds, the average being 19.6 seconds. The ether time in these patients ranged from 6.6 seconds to 21.2 seconds and averaged 11.2 seconds. Those with circulation time longer than 20 seconds for decholin, or 10 seconds for ether, were all in the age group over 60 and had evidence of grave extracardiac disease.

TABLE 4.—*Average Six Hour Urinary Output*

	1,000 Cc. Physiologic Solution of Sodium Chloride, Cc.	1,000 Cc. 5% Dextrose, Cc.	1,000 Cc. 10% Dextrose, Cc.	200 Cc. 50% Dextrose, Cc.	200 Cc. 50% Dextrose with 8 Gr. Aminophylline, Cc.	50 Cc. 50% Dextrose with 8 Gr. Aminophylline, Cc.
Grade 4	...	...	380	545	755	825
Grade 3	...	...	804	320	865	...
Grade 2	...	...	...	490	1140	780
Grade 1	...	...	898	...	...	200
Noncardiac	412	900	...	...	...	...

The noncardiac persons with initial normal circulation time and the cardiac patients with normal or prolonged circulation time usually had an initial increase in both decholin and ether times followed within one hour by a decrease below the intial time, which persisted for four hours. There was little difference in the extent or direction of change with the volumes employed, the rate of injection, composition of the solution or degree of cardiac compensation. The noncardiac persons with prolonged initial circulation time had an initial decrease in the circulation time to within normal limits persisting for four hours.

Vital Capacity.—An increase or decrease of more than 5 per cent was considered significant. All our noncardiac patients showed no significant change in vital capacity with administration of fluid. Cardiac patients with different degrees of compensation showed a significant decrease in the vital capacity at times on taking fluids, though clinically improved, and at other times a significant increase with clinical evidence of increasing failure.

Pulse, Respiration and Blood Pressure.—In common with almost all other workers, we found no significant or constant changes in the pulse or respiration of cardiac and noncardiac patients on fluid administration regardless of the rate, volume or type of fluid, except those patients with heart failure made worse, or going into acute left ventricular failure, when an increase usually occurred. Except with 1,000 cc. of 10 per cent dextrose in water, wherein increase in blood pressure was usually noted during and one hour after administration, there was no significant change in blood pressure, unless heart failure ensued or became worse.

Electrocardiograms.—Electrocardiograms were taken in 58 cases. There was no change in 72.4 per cent of our cases. A decrease in QRS voltage returning to normal at the end of four hours occurred in 5.2 per cent and a decrease in QRS not returning to normal in four hours in 3.45 per cent. Increase of QRS voltage persisting after four hours, persistently negative T_3, gain in T_3 and T_1 voltage and bigeminal rhythm occurred once each. There was no correlation between response of the cardiovascular system to fluids and electrocardiographic changes. No constant electrocardiographic changes were produced in our cases.

Urinary Output.—The average six hour urinary output for the different types of patients is shown in table 4.

1. Diuresis was greatest in those cases of marked edema in which the kidney function was normal. Therefore, in rheumatic and syphilitic heart disease with congestive failure the diuresis was greater than in hypertensive and arteriosclerotic heart disease with the same amount of congestive failure.

2. With 5 per cent dextrose in water, the greatest diuresis occurred and in six hours about equaled the intake of fluid.

3. With 5 per cent dextrose in saline solution the diuresis was about one-half that for 5 per cent dextrose in water.

4. With physiologic solution of sodium chloride the diuresis was less than half that for 5 per cent dextrose in water.

5. Hypertonicity of the dextrose solution increased the diuresis, and the addition of aminophylline further increased the diuresis.

6. The onset of diuresis in general coincided with the fall in plasma volume and venous pressure.

Clinical Changes.—One hundred per cent of the group 4 cardiac patients given 1,000 cc. of 10 per cent dextrose were made worse, 66 per cent of the group 4 patients given 200 cc. of 50 per cent dextrose with 8 grains (0.5 Gm.) of aminophylline were made worse, and 40 per cent of those given 200 cc. of 50 per cent dextrose in water were made worse.

Of 19 cardiac patients in group 3 compensation, 15.8 per cent were made worse when given fluid in volumes of 200 cc. or more.

In the cardiac patients of groups 1 and 2 compensation and all the noncardiac persons, no constant change in clinical condition was noted except for the development of pitting edema and weight gain in 50 per cent of those receiving 3,000 cc. of physiologic solution of sodium chloride daily for three days.

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7. Greene, J. A.; Paul, W. D., and Feller, A. E.: Action of Theophylline with Ethylenediamine on Intrathecal and Venous Pressures in Cardiac Failure and on Bronchial Obstruction in Cardiac Failure and in Bronchial Asthma, J. A. M. A. **109**: 1712 (Nov. 20) 1937.

COMMENT

From our results it appears that these tests of cardiovascular function cannot be relied on to determine preclinical evidence of unfavorable response of the cardiovascular system to fluids. The careful clinical examination of the patient with regard to the condition of the cardiovascular system remains the most important safeguard in determining the type, quantity and speed of intravenous infusions.

The introduction of fluid intravenously will cause an initial increase in plasma volume, blood volume and venous pressure. These initial increases are fairly constant for the type of fluid, rate of administration and degree of cardiac compensation. They persist for a period of thirty to forty minutes and then, regardless of continued introduction of fluid, tend to fall.

If the decrease were in venous pressure alone, vasodilatation as proved by Meek and Eyster [8] and Eyster and Middleton [9] could be the explanation. The coincidental fall in plasma and blood volumes, however, necessitates the consideration of additional factors. By utilizing weight changes and urinary excretion, some of these additional factors can be illustrated.

In solutions with aminophylline and hypertonic dextrose solution, the changes are mainly due to increased elimination through the kidneys.

With physiologic solution of sodium chloride, urinary excretion is insufficient to account for the changes and other mechanisms must be sought. Jacobs and Colwell [10] and Cutting, Lands and Larson [11] have shown that excretion through the gastrointestinal tract and increased intracellular and extracellular water deposition are important with isotonic and hypertonic salt solutions. As the patients gained weight despite the small increase in plasma volume, extracellular water deposition must be assumed.

The less marked increase of plasma and blood volume in cardiac decompensation with less pronounced rise in venous pressure and decreased urinary excretion suggest more rapid loss of fluid from the vascular system into the extracellular or intracellular depots. This rapid loss may be due to (1) a mechanical defect, the increased venous pressure preventing reabsorption at the venous end of the circuit; (2) tissue injury with loss of intracellular potassium increasing the osmotic tension of the extracellular fluid as suggested by Scudder; [12] (3) injury to the capillary wall with increased loss of protein, which seems unlikely in view of the elevated plasma protein, or (4) some other chemical alteration of the intravascular or extravascular fluid upsetting the osmotic equilibrium.

From our studies we have shown that the venous pressure is not always sufficiently elevated to be the sole cause of the well known hemoconcentration occurring in heart failure or the decreased plasma and blood volume changes observed in our patients going into failure. By inference, then, one of the other chemical changes must be suspected.

It appears from this that the distribution of the fluid in the various systems and the proportionate importance of the different routes of elimination is dependent on the type and concentration of the solution, degree of cardiac compensation, integrity of renal function, state of hydration of the patient, mechanical factors of venous pressure changes and changes in the chemical constituents of the tissues and tissue fluids.

In considering circulation time, the normal values for arm to tongue time have been found to be between 10 and 16 seconds, averaging 13 seconds.[13] The normal values for ether in the arm to lung time have been found to vary between 3 and 8 seconds with an average of 5.5 seconds.[14] Prolongation of arm to tongue time beyond 20 seconds or arm to lung time beyond 10 seconds has been assumed to be indicative of left, right or total heart failure, in the absence of polycythemia or reduced metabolic rate. The frequent occurrence of much higher values in our elderly patients without heart disease, but with other serious organic disease, is contrary to expectations and has not been explained. It must be remembered that the use of these tests is not an accurate index of the velocity of circulation between two points (1) because the velocity of blood flow is not constant in all parts of a single vessel, the axial stream, composed of solid elements, being faster than the peripheral plasma; (2) because the velocity of flow of the injected solution is different than the velocity of the blood; (3) because the velocity of flow is dependent on the diameter of the vessel which is not constant, and (4) because of the reaction time [15] of the individual, which is not known to be constant. This complicated relationship of decholin and ether time to velocity of blood flow would in itself make the test of little value in determining preclinical evidences of cardiovascular failure.

The vital capacity is not a satisfactory test for determining preclinical changes in the cardiovascular system, apparently because factors other than pulmonary congestion and edema play a part in the production of dyspnea. Cooperation of the patient, anoxia of the medullary respiratory center, increased intracranial pressure and changes in the coronary flow have been postulated as extrapulmonary causes of dyspnea.

Our failure to find significant changes in the electrocardiogram which would be of assistance in determining the onset of failure corroborates the absence of significant changes found by Miller and Poindexter [16] in dogs.

The clinical observation that 50 per cent of group 4 cardiac patients, from 20 to 50 per cent of group 3 cardiac patients and occasional group 2 cardiac patients are made worse by from 100 to 200 cc. of 50 per cent dextrose solution, with or without 8 grains (0.5 Gm.) of aminophylline, suggests that this volume of fluid often advocated in the treatment of acute left ventricular

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15. Kvale, W. F., and Allen, E. V.: Rate of Circulation to Arteries and Veins of Man: Studies of Normal Subjects and of Those with Occlusive Arterial Disease and Hyperthyroidism, Am. Heart J. **18:** 519 (Nov.) 1939.

16. Miller, J. R., and Poindexter, C. A.: The Effects Observed Following the Intravenous and Subcutaneous Administration of Fluid, J. Lab. & Clin. Med. **18:** 287 (Dec.) 1932.

failure [17] is unsafe, and volumes not greater than 50 cc. should be used.

CONCLUSIONS

1. No tests of cardiovascular function, so far known, will enable us to determine beforehand that the patient will respond unfavorably to fluids administered intravenously.

2. Careful clinical examination to determine the presence or absence of heart disease is still the best preventive for unfavorable reactions to fluid.

3. In the presence of heart disease, regardless of the state of compensation, fluids must be given slowly, in small volumes, preferably isotonic and repeated at intervals of not less than four to six hours.

4. These tests of cardiovascular function showed few constant changes even with the precipitation of heart failure.

5. Fifty per cent dextrose solution, with or without 8 grains (0.5 Gm.) of aminophylline, in volumes of 100 cc. or more, at rates of 10 cc. a minute, are extremely dangerous when used in treatment of heart failure, making from 50 to 100 per cent of the patients worse and precipitating failure in 20 per cent of grade 3 cardiac patients.

6. Fifty per cent dextrose solution with 8 grains of aminophylline in doses of 50 cc. improved the dyspnea of cardiac failure in all our cases, decreased the venous pressure and increased the urinary output.

7. The danger of fluid injection in cardiac patients may not be in increasing blood volume per se but rather in further altering the already disturbed chemistry of the body fluid, thus increasing osmotic pressure derangements.

8. The ultimate fate and mode of distribution or loss of injected fluid is dependent on the kind and concentration of the solution, state of hydration of the patient, degree of cardiac compensation, level of venous pressure and chemistry of body tissues influencing osmotic pressure.

9. Physiologic solution of sodium chloride may prove more useful in increasing blood volume than hypertonic solutions.

10. Noncardiac patients in the older age groups tolerated fluids as substitution therapy, in amounts up to at least 3,000 cc. daily in 1,000 cc. doses at rates of from 20 to 40 cc. per minute, even in the absence of dehydration.

11. Alternation of dextrose with the physiologic solution of sodium chloride obviated the changes in blood dilution, weight gain and occult or visible edema occurring with physiologic solution of sodium chloride alone.

12. The indiscriminate use of intravenous fluids, especially for persons with any cardiovascular defect, should be discouraged and the safeguards suggested be more strictly adhered to.

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ABSTRACT OF DISCUSSION

DR. N. C. GILBERT, Chicago: None of us doubt the value of parenteral fluid under certain conditions, such as dehydration, in certain cases of shock, or the use of moderate amounts postoperatively in cases in which there are definite indications. But many clinicians have felt that fluids were administered unnecessarily and in too large amounts and that not infrequently there were harmful results. There has been little in the way of concrete evidence on which conceptions of indications or contraindications might be based. This paper has afforded definite evidence that harmful results may ensue from the use of fluids under certain conditions. A word of caution is timely. A few years ago Jones, Eaton and White published evidence on the subject which has not received the attention it merited. Their experimental work on animals complements the experimental clinical work of Dr. Murphy and his associates. It is valuable also because they could give large amounts of fluids without regard to an ultimate effect on the subject and were able to examine the tissues at immediate autopsy. Their experimental work was done on cats under various conditions, using 5 per cent dextrose solution or physiologic solution of sodium chloride in large amounts, but not larger than amounts frequently used clinically. They found that edema resulted not only in subcutaneous tissues but in the viscera as well. In the heart the increase in water content might amount to 4 or 5 per cent or even 10 per cent. Some of the factors influencing the occurrence of edema appeared to be nitrogen starvation, general malnutrition, sepsis, serous drainage, major surgical procedures and general anesthesia. That heart failure actually resulted in a large proportion of group III or group IV patients needs no comment, especially when it is considered that the amount of fluid used was rather moderate. The increase in plasma volume was definite. In a normal organism this could be taken care of readily by the kidney. But in cases in which the kidneys are unable to do their part it might devolve on the tissues to accommodate much of the excess fluid. If this was not done promptly the increase in blood volume would remain. If the tissue did take up the fluid, edema of the subcutaneous tissues or viscera would result to some degree.

DR. IRVINE H. PAGE, Indianapolis: It has always been surprising to me that fluids are administered intravenously with but the slightest knowledge of the amount to give and only little greater knowledge of what clinical effects to expect. Drs. Murphy, Correll and Grill have exhibited a worthy curiosity in investigating this problem. Certain facts stand out clearly from this study: 1. There is no laboratory test which will predict unfavorable results from properly administered fluid. 2. Initial increase in blood volume and venous pressure occur, lasting from thirty to forty minutes, and then tend to disappear despite continued introduction of fluid. 3. Different fluids may be disposed of in different ways: (*a*) aminophylline and hypertonic dextrose solution chiefly by renal excretion, (*b*) physiologic solution of sodium chloride by the renal and gastrointestinal tract, and so on. 4. In cardiac decompensation the blood volume and venous pressure changes are less marked than normal, presumably because of more rapid loss of fluid into the intracellular space. 5. At least half of the patients with advanced left ventricular failure and one fourth of the less severe (group III) are made worse by amounts of 50 per cent dextrose over 100 cc. or 1 liter of isotonic dextrose solution regardless of whether or not aminophylline is given. Since many physicians have recommended much larger doses, this observation should be remembered. Lesser amounts appear to improve the dyspnea without necessary increase in vital capacity. Venous pressure decreases and diuresis occurs. The crux of the problem is that, when cardiac disease is present, fluids should be administered very slowly in amounts of not over 100 cc. for hypertonic and 1,000 cc. for isotonic solutions. This investigation emphasizes the importance of not giving fluids by vein in advanced cardiovascular disease without shock unless one has some specific purpose in mind. Unfortunately these purposes are not clearly defined. It is generally recognized that dextrose infusion is valuable when, because of vomiting, the patient is unable to take fluids by mouth. Second, it appears to decrease the severity of the dyspnea. Whether it is true that dextrose aids in the nutrition of the heart to the extent that it should be given intravenously seems to me very doubtful. Drs. Murphy, Correll and Grill have shown that administration of fluid in advanced cardiovascular disease has potential dangers and that, if given at all, it should be in small amounts, administered slowly.

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THE USE OF ALUMINUM HYDROXIDE IN THE TREATMENT OF PEPTIC ULCER

A FOLLOW-UP STUDY OF 246 CASES

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During the past four years, the use of colloidal aluminum hydroxide [1] has been included in the treatment of 470 patients having active peptic ulcer. Of 246 patients who had follow-up studies, satisfactory results were obtained in 88 per cent.

Judged by the relief of symptoms, the disappearance of formerly visualized ulcer craters, by progress roentgen examinations, and in the case of gastric ulcers by gastroscopic examinations as well, the immediate results of treatment compared favorably with those obtained by other forms of medical management.

However, since evaluation of treatment in this disease is difficult because of the factor of spontaneous remission, our chief purpose in this study was to appraise results in terms of the duration of these remissions.

Colloidal aluminum hydroxide has been substituted for the usual alkalis in the antacid therapy of peptic ulcer. It has advantages over the usual alkalis aside from its acid-combining power. In addition to its acid-combining power, its astringent and demulcent properties are of value. It does not liberate large quantities of carbon dioxide, as do the carbonates; it is not laxative, like the magnesium salts, and its use does not cause a compensatory stimulation of acid secretion like sodium bicarbonate. It is not absorbed and therefore can be given without the hazards of alkalosis, or precipitation of crystalline phosphates in an alkaline urine. In none of our cases has there been a disturbance of the acid-base balance or urinary complications.

The present view relative to its acid-combining power is that gastric secretions are inactivated to a p_H compatible with the healing of pathologic tissue and that this action is reversed at the more alkaline levels of the duodenum, where the treated chyme continues to act as an acid.

Considering its neutralizing influence alone, Kirsner and Palmer [2] found that aluminum hydroxide was less effective than calcium carbonate, when determinations of the hydrogen ion concentration of gastric contents were made with a Beckman p_H meter. They state "It is possible that the mere reduction in acidity from that of HCl to the acidity of an equimolar concentration of aluminum chloride is adequate for the protection of the diseased area."

We have found that the free acidity of gastric contents can be continuously neutralized if sufficient quantities of aluminum hydroxide are given, using Topfer's reagent as an indicator. At the start of treatment in hospital patients, analyses of hourly aspirations during various twenty-four hour periods have been done in order to determine the correct dosage. However, after the first two weeks of treatment, smaller quantities of aluminum hydroxide have been used without detriment to the patients. At the present time we believe that properties other than its acid-combining power are at least of equal importance in explaining the satisfactory results obtained with this form of treatment.

METHOD OF ADMINISTRATION

Analyses of the records in the present study show that no set routine was used in the administration of aluminum hydroxide. During the course of time changes have been made, but the object has been to formulate a plan which is flexible according to all features of the individual case.

One third of the 246 patients who used only medical management in this series had complications of duodenal ulcer, such as continued night secretion, or had gastric, multiple or marginal (anastomotic) ulcers with or without complications. Hospital management was used in the majority of these instances. In certain cases the continuous drip method of Winklestein,[3] developed by Woldman and Rowland,[4] was the method used in administering aluminum hydroxide. In other cases aluminum hydroxide was given orally during sleeping hours as well as during other hours. During the first week it was given at 12 midnight and at 2 and 4 a. m., usually in twice the dosage used during the daytime hours. During the second week of treatment, aluminum hydroxide was given at 12 midnight and 3 a. m. The amount used depended on analyses of hourly aspirations of gastric contents during two or more twenty-four hour periods of management.

Although gastric acidity was not completely and continuously neutralized during these periods, our aim was to keep the level of free acidity sufficiently low to prevent activation of pepsinogen, the proteolytic neutralization point emphasized by Hollander.[5]

Other modifications of the Sippy regimen,[6] similar to those used by Einsel, Adams and Myers [7] and by Woldman and Polan,[8] were used in these cases. Liquid petrolatum in 1 or 2 ounce (30-60 cc.) doses, and occasionally magnesium oxide or aromatic fluidextract of cascara sagrada, was given at bedtime to prevent constipation until the patient was including sufficient vegetables and fruit in his diet to assure proper bowel function.

If the clinical response of the patient was favorable, confirmed by progress roentgen examination and, in the case of gastric ulcer, also by gastroscopic examination,

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Dr. Pritchett was formerly of the Cleveland Clinic.

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1. The preparation used by the patients in this study was either Amphojel, manufactured by John Wyeth & Brother Inc., of Philadelphia, or Creamalin, manufactured originally by the Cleveland Chemical Associates and now by the Alba Pharmaceutical Company, Inc., of New York, neither of which stand accepted by the Council on Pharmacy and Chemistry. Either preparation contains about 5 per cent of hydrated alumina and not more than 0.6 per cent of sodium chloride. It is a white, gelatinous substance, mildly astringent, nonirritating and amphoteric, with a p_H of 6.9. It combines with twelve times its volume of tenth-normal hydrochloric acid within thirty minutes. The Council and the A. M. A. chemical laboratory are in process of elaborating standards for a suitable suspension of aluminum hydroxide.

2. Kirsner, J. B., and Palmer, W. L.: Effect of Various Antacids on the Hydrogen Ion Concentration of the Gastric Contents, Am. J. Digest. Dis. **7**: 85-92 (March) 1940.

3. Winklestein, A.: A New Therapy of Peptic Ulcer: Continuous Alkalinized Milk Drip into the Stomach, Am. J. M. Sc. **185**: 695-703 (May) 1933.

4. Woldman, E. E., and Rowland, V. C.: New Technic for the Continuous Control of Acidity in Peptic Ulcer by the Aluminum Hydroxide Drip, Am. J. Digest. Dis. & Nutrition **2**: 733-736 (Feb.) 1936.

5. Hollander, F.: What Constitutes Effective Neutralization of Gastric Contents? Am. J. Digest. Dis. **6**: 127 (April) 1939.

6. Sippy, B. W.: Gastric and Duodenal Ulcer: Medical Cure by an Efficient Removal of Gastric Juice Corrosion, J. A. M. A. **64**: 1625-1630 (May 15) 1915.

7. Einsel, I. H.; Adams, W. L., and Meyers, V. C.: Aluminum Hydroxide in the Treatment of Peptic Ulcer, Am. J. Digest. Dis. & Nutrition **1**: 513-516 (Sept.) 1934.

8. Woldman, E. E., and Polan, C. G.: Value of Colloidal Aluminum Hydroxide in the Treatment of Peptic Ulcer, Am. J. M. Sc. **198**: 155-164 (Aug.) 1939.

the use of aluminum hydroxide during sleeping hours was usually discontinued by the end of the second week. If it had been given hourly during waking hours, its administration was then changed to a two hour schedule, and ambulatory management as mentioned for uncomplicated duodenal ulcer was continued.

Uncomplicated Duodenal Ulcer.—Two thirds, or 154, of the patients in this series had uncomplicated duodenal ulcer. Most patients were ambulatory and they carried on with their usual occupation. Although the regimen advised was flexible according to severity of symptoms, in most instances the use of 2 drachms (4 Gm.) of aluminum hydroxide every two hours during waking hours for three months proved satisfactory. Either a meal or a glassful of milk was taken midway between doses of aluminum hydroxide. During the next three months a glassful of milk was taken midway between meals and 2 drachms of aluminum hydroxide was taken one hour after each meal, after each glassful of milk and at bedtime. During the remainder of the first year's treatment the taking of similar doses of aluminum hydroxide after the three main meals and at bedtime seemed to prove adequate.

It should be mentioned that certain patients having mild symptoms started treatment with three meals a day and a glassful of milk midway between meals, taking aluminum hydroxide one hour after each meal, after each glassful of milk and at bedtime. In an attempt to maintain a low gastric acidity and owing to the well known "ulcer diathesis" of patients having this disease, each patient is now instructed to take at least one feeding or a glassful of milk midway between meals for the remainder of his life.

TABLE 1.—*Peptic Ulcer Follow-Up Studies in 246 Cases*

	Number of Cases	Satisfactory Results	
		Cases	Per Cent
Duodenal ulcer, uncomplicated	154	150	97.5
Duodenal ulcer, massive hemorrhage	15	12	80.0
Duodenal ulcer, pyloric obstruction (temporary)	12	12	100.0
Gastric ulcer (6 cases showed complications)	37	33	89.0
Multiple ulcers, both gastric and duodenal	8	6	75.0
Marginal ulcers, jejunal	7	5	71.0
Surgical cases (medical failures)	13	0	0.0
Total	246	218	88.0

If there is a history of seasonal recurrences, the patient is now advised to resume the two hour schedule of using aluminum hydroxide two weeks prior to the time of these recurrences each year, usually during the spring and fall, for a period of two months, over a five year perod of time. The healing of any one peptic ulcer does not mean that the patient will not have another ulcer.

DIET

The diet has become more liberal since the use of aluminum hydroxide has been included as a part of management. The gain in weight of the average patient was as great on this management as was the case in other types of management. Three meals a day, consisting of the usual bland diet, were used at the start of treatment, and within the first week meat has been added. Ground meat was used at the start of treatment in cases of massive hemorrhage.[9] By the end of the second week vegetables and fruit in cooked form and soon thereafter citrus fruit juices were included. The importance of a well balanced diet has been emphasized in all instances.

RESULTS OF TREATMENT

Nineteen patients having surgical procedures either had pyloric stenosis or used aluminum hydroxide only during postoperative management and so are not included in this follow-up study. However, another group of 13 patients who failed to make a favorable response to the use of aluminum hydroxide and later had surgical procedures are included. In other instances the location of the ulcers and the types of problems encountered at the time of the original examinations and the results of the treatment are given in table 1.

TABLE 2.—*Uncomplicated Duodenal Ulcer, 154 Cases*

Duration	Continuous Remissions (Cases)	Recurrences of Symptoms (Cases)	Satisfactory Results, per Cent
2 to 11 months (64 cases)	63	1	98.4
12 to 48 months (90 cases)	87	3	96.6
Average			97.4

Uncomplicated Duodenal Ulcer.—The largest number of patients had uncomplicated duodenal ulcer; 154, or two thirds, of the 246 cases were included in this group. The results obtained in terms of duration of complete and continuous remissions are shown in table 2.

Since 97.4 per cent of 154 patients had satisfactory results, this form of therapy should offer a good prognosis in uncomplicated duodenal ulcer if the patient will follow management. Since the patients who had continuous remissions from two to eleven months may be said to have had only a favorable initial response to treatment, we believe that special significance should be given to the group of 87 patients of whom the duration of the continuous remission was known to have existed longer than one year (table 3).

Complications—Duodenal Ulcer, Massive Hemorrhage.—Fifteen patients who had massive hemorrhage from duodenal ulcer at the start of treatment have continued to follow management. Twelve patients, or 80 per cent, have obtained satisfactory results. Five patients have been followed for from two to eleven months, and 7 have been followed for from one to four years.

TABLE 3.—*Duration of Continuous Remissions, Uncomplicated Duodenal Ulcer*

	Cases
From 1 to 1½ years	25
From 1½ to 2 years	19
From 2 to 2½ years	19
From 2½ to 3 years	10
From 3 to 3½ years	4
From 3½ to 4 years	10
Total	87

Complications—Duodenal Ulcer, Pyloric Obstruction.—Since pyloric obstruction from cicatricial stenosis is a classic indication for surgical treatment, this phase of the subject ordinarily would not be considered in an appraisal of medical management. However, the initial roentgen examination may show the presence of pyloric obstruction without actual fibrosis being present. If the condition has been present for a short time, the cause of the obstruction may be spasm or inflammatory edema and may be relieved by medical management. These

9. Collins, E. N., and Knowlton, R. S.: Review of 141 Consecutive Cases of Massive Hemorrhage from Upper Gastrointestinal Tract, Ohio State M. J. **35**: 1175-1180 (Nov.) 1939.

factors were suspected in a group of twenty-one cases at the time of the initial examination. Nineteen patients had relief of the obstruction and 12 have been followed, 7 for from two to eleven months and 5 for from one to three years. Medical management, including the use of aluminum hydroxide, was continued and satisfactory results were maintained in each of the twelve instances. Other measures [10] used during the first seven to ten days of treatment were daily gastric lavage and parenteral fluid therapy, including the intravenous administration of hypertonic (3 per cent) sodium chloride, thiamine hydrochloride and ascorbic acid. Daily urinary chloride determinations were made until the obstruction was relieved. The use of aluminum hydroxide has been found a safe procedure and has not increased the tendency to alkalosis of these patients.

Gastric Ulcer.—In a series of 68 cases of gastric ulcer it was known that operation had been performed in 7 and no follow-up studies were available in 24 cases. The remaining 37 patients received only medical management. Satisfactory results were obtained in 33 cases, or 89 per cent, even though surgery had previously been advised in certain instances. Since the duration of follow-up studies was only one year or less in 20 of these cases, the permanent value of this study is questionable in this group. However, we were surprised to find that satisfactory results were maintained in certain complicated cases, as quoted in table 4.

TABLE 4.—*Gastric Ulcer, 33 Cases*

Satisfactory results on medical management alone Twenty cases were followed for one year or less Diagnoses at time of original examination include:		
Cases	Diagnosis	Duration of Follow-Up
3	Without complications.....	14, 14 and 18 months
2	Massive hemorrhage.....	2 and 16 months
4	Pyloric obstruction (temporary)	1, 4, 7 and 11 months
4	Deeply penetrating.....	1, 10. 26 and 41 months

Multiple Ulcers.—In a series of 18 cases a diagnosis of multiple ulcers was made; that is, one or more ulcers were present in both the duodenum and the stomach. Follow-up studies were made on 11 patients, and 2 had had operations soon after the diagnosis was made, 1 for obstruction and the other for recurrence with continued pain. One patient did not follow management. Six of 8 patients, or 75 per cent, who followed the prescribed medical management had satisfactory results. Two of the 6 patients had massive hemorrhage at the time of the initial examination.

Marginal Ulcers.—A diagnosis of marginal or anastomotic ulcer was made in 9 cases. Of this group 7 patients had follow-up studies. At the time of this study no operations have been performed, and 5 patients who followed the prescribed medical management have obtained satisfactory results. Three patients were followed two, eight and thirty-three months respectively; 1 patient had relief from a complicating obstruction and 1 patient with the complication of massive hemorrhage at the time of the original examination had been followed thirty-nine months.

COMMENT

Obviously, the recorded results cannot be attributed to the use of aluminum hydroxide alone. The hygienic needs of the individual patient were considered first, and many additional factors, such as the avoidance of undue fatigue, stresses and strains, and the taking of at least one feeding between meals received equal emphasis. Prior to starting treatment most of these patients had had recurrences of symptoms two or three times annually for a number of years, but even in these instances the patient may have a spontaneous remission lasting one or more years. It is also known that patients on whom follow-up studies can be made are usually those who will cooperate on any form of management. Since the likelihood of cooperation on the part of the patient is important, one of the aims of the present study was to find a method of treatment which is adequate and yet sufficiently simple so that cooperation may be expected.

We believe that greater emphasis should be placed on the initial visit of the patient to his family physician. If the management advised at this time is adequate and cooperation on the part of the patient is obtained over a long period of time, complications may be prevented in the future.

Although all schools for treating peptic ulcer emphasize the hygienic needs of the individual, most of them believe that special attention should be given either to the secretory or to the motility factors or to both. In 1929 Crohn [11] demonstrated the advantages of aluminum hydroxide as an antacid in the treatment of peptic ulcer. Recently, although Kirsner and Palmer [2] found that it did not have antacid properties equal to a combination of calcium carbonate and atropine, they state "A rapidly accumulating mass of evidence indicates that aluminum hydroxide has a definite place in the treatment of peptic ulcer." Adams,[12] in a critical evaluation of gastric antacids, believes that it is the most satisfactory antacid thus far employed. He also mentions its influence in the adsorption of such toxins as histamine and the possibility of its removing bacteria from ulcerating surfaces. The Komarovs,[13] working with Pavlov pouch dogs, found that it exercises not only an antacid but also an antipeptic action. Quantities which were not sufficient to react with all the free acid of the gastric juice were sufficient to precipitate considerable proportions of pepsin. Therefore it would seem that the beneficial effect of aluminum hydroxide may be due to several factors and not to its antacid properties alone.

ABSTRACT OF DISCUSSION

DR. JAMES FLEXNER, New York: The fact that Dr. Collins and his associates were able to control the ulcer symptoms satisfactorily in 88 per cent of 246 patients using aluminum hydroxide as the antacid is of great significance. I would suggest, however, a modification of their routine based on studies which have recently been completed. In collaboration with Mr. Michael Kniazuk at the Merck Institute of Therapeutic Research I have studied the effect of various antacids on dogs with hypersecretion and we have continuously recorded the p_H change which occurred in the stomachs. In studying aluminum hydroxide suspension (amphojel) 30 cc. was used. This caused a rise in p_H to a level of 4.5 and this level persisted for from four to six hours. When we did comparable studies in vitro we found that a similar dose required 810 cc. of tenth normal hydrochloric acid to bring the level back to the control level at which we started. This is a very important feature in that one can decrease frequent small doses, and this is particularly important at night, when the patient can

10. Collins, E. N.: Chronic Dyspepsia: Common Causes and Approach to Treatment, M. Clin. North America **22**: 417-432 (March) 1938.

11. Crohn, B. B.: Clinical Use of Colloidal Aluminum Hydroxide as a Gastric Antacid, J. Lab. & Clin. Med. **14**: 610-614 (April) 1929.

12. Adams, W. L.: Critical Evaluation of Gastric Antacids, Arch. Int. Med. **63**: 1030-1047 (June) 1939.

13. Komarov, S. A., and Komarov, Olga: Precipitability of Pepsin by Colloidal Aluminum Hydroxide, Am. J. Digest. Dis. **7**: 166-169 (April) 1940.

be allowed to get more rest. Another important point in the report was the excellent record of the authors in the lack of frequent recurrences. This observation brings to mind the possibility that commonly used insoluble alkaline powders which cause p_H rises in the stomach to levels of 9 or 10 may actually be deleterious. This idea is supported by three arguments. In the first place, natural occurring foods, both cooked and uncooked, have a p_H range from 3 to 7. Second, the most severe type of gastritis often occurs in stomachs that have been operated on. The third argument is that at the Second (Cornell) Division at Bellevue Hospital, where we routinely do a gastroscopy on every patient that is admitted to the clinic, we find a very high percentage of gastritis in these chronically affected patients, and we feel that most of their chronic symptoms are due to gastritis and all of these patients have for many years been on the old Sippy type of regimen. While it is generally agreed that gastric acidity should be buffered in peptic ulcer, there is the possibility that the acidity is a protective factor and it should not be completely carried out of the acid range. The work of Dr. Collins and his associates has clearly demonstrated that the buffering effect of aluminium hydroxide is adequate to keep the patient comfortable and allow healing of the peptic ulcer. Their excellent remission record suggests that much of the chronicity of peptic ulcer may be obviated by the use of this type of buffer therapy.

DR. ARTHUR J. ATKINSON, Chicago: I should like to ask what percentage of the authors' cases were treated by the aluminum drip, which seems quite a bit in vogue, and what they consider to be the indication of the continuous aluminum drip. Physicians in Chicago also have had some good results in using aluminum preparations, but we have had good results using almost any medicament, antacid, sometimes no medicament, in the treatment of the ordinary peptic ulcer. It is in the severe ulcers that result after operative procedures that we have a great deal of trouble. Dr. Ivy, in attempting to evaluate various types of treatment, performed the Mann-Williamson operation on dogs and used aluminum hydroxide in an attempt to prevent and to cure ulcers. The results in these Mann-Williamson dogs were unsatisfactory, and that was probably due to the aluminum hydroxide interfering with phosphorus metabolism, with loss of phosphates. In these dogs the pancreatic juice and the biliary secretion enter the intestine lower than usual, so that the aluminum hydroxide is allowed to form chlorides in the stomach; then aluminum phosphates form with a loss of phosphorus. This may not be of significance in the ordinary ulcer patient, when an ordinary diet has an abundant amount of phosphorus, but in patients having a disturbance of the normal physiology of the stomach due to operative procedure this loss of phosphorus may delay healing. In order to cure and to prevent ulcers in Mann-Williamson dogs, Dr. Ivy used aluminum phosphate to prevent the formation of aluminum phosphate by the aluminum hydroxide. The aluminum phosphate gave better results than anything he had used so far but produced a slight anemia, which was corrected by the administration of iron. I then used the aluminum phosphate in the clinical treatment of ulcer of patients with complicated and some uncomplicated ulcers and found that the aluminum phosphate also was satisfactory. We do not claim that aluminum phosphate will be any better than aluminum hydroxide in the ordinary ulcer excepting in such patients as may have a relative absence or deficiency of secretion of the pancreas or of the bile with a loss of those alkaline intestinal juices.

DR. I. H. EINSEL, Cleveland: My experience with aluminum hydroxide is now over a period of twelve years, and the authors' results have conformed closely to those which my associates and I have obtained. In our series success has been 92 per cent, in the experience of Collins and his co-workers 88, and there is no fundamental difference. How does it act in the cure of peptic ulcer? We have followed cases four years with repeated gastric analysis, and we find that we can determine the level of the free acid in the stomach by the amount of the aluminum hydroxide gel intake. Before starting the patient on aluminum hydroxide gel we do a gastric analysis with the alcoholic test meal. This is repeated frequently to determine whether the dosage of aluminum hydroxide gel is adequate. If it is not we increase the dosage. After a year or a year and a half we find that the free acid at the height of the stimulating test meal many times goes no higher than 5 units, and a total of no higher than 12. Therefore the secretion of free hydrochloric acid is controlled, and that is the condition we are most interested to have in the gastric juice so that the ulcer is able to heal. Second, we found that the volume of secretion, the stimulation of aluminum hydroxide, is much less than with other antacids. Third, the secretion of mucus is increased in the gastric juice volumetrically determined in these specimens, with the stimulation due to the alcoholic test meal. The cases of failure are of more interest than those of success. Why do we have a failure in the treatment with aluminum hydroxide? We must critically analyze our failures to make sure we are not trying to deal with operative gastrointestinal cases, such as cases with obstruction with organic disease at the pylorus; second, that we do not have perforating duodenal or gastric ulcers into the pancreas or that we are not trying to heal a carcinoma of the stomach. Ulcerative cancer of the stomach under aluminum hydroxide therapy appears to heal, but in a few months the carcinoma overshadows the ulcer syndrome and we are chagrined because of the patient's having appeared very much improved at first but now the real nature of the ulcer becomes apparent to any one. In our failures we should be sure that we are treating really medical gastrointestinal cases and that they are not surgical problems.

DR. ISIDOR GREENWALD, New York: I should like to ask the authors whether they have observed in their series any indications of alkalosis or of a hypovitaminosis. The first question is suggested by the observations made by a previous discusser that aluminum hydroxide diverts phosphates to the bowel. If it does that, and one must take for granted that it does in some cases, it must tend to produce alkalosis. The second question is suggested by the fact that aluminum hydroxide is one of the best agents in the chemical laboratory for the absorption of many chemical substances, many of which can be removed later with only the greatest difficulty. It is rather important to be sure that aluminum hyroxide, given to persons whose diet may not be very rich in one or more vitamins, does not remove or make unavailable to them such vitamins. With the record of gastroenterologists of producing scurvy and beriberi on restricted diets, or the production of alkalosis by the use of bicarbonate, I believe that the use of aluminum hydroxide or other materials of the kind for years should be discouraged. At any rate, it ought to be used with a great deal of caution.

DR. MANFRED KRAEMER, Newark, N. J.: In the wave of enthusiasm for the use of aluminum hydroxide, with or without a drip, a few words expressing its disadvantages are apropos. I have used aluminum hydroxide for a number of years. My initial enthusiasm has weakened because the anticipated results were no better than those usually obtained with the commonly employed antacids. The 88 per cent of remissions is not unusual in any well controlled study by a clinician who is careful in the management of his cases. These results are no better than usually reported in large series employing any antacid. One of the chief disadvantages of aluminum hydroxide is its expense. Expense of treatment is an important factor in ulcer patients. In an industrial community the average income of ulcer patients is probably $35 a week. They are the heads of families, young men with young children. In order to supply aluminum hydroxide jell in the amount mentioned by the authors the patient would have to expend about $3 a week for his aluminum hydroxide. This is too large an item in the budget of the average wage earner. I am sure that an equal effect can be obtained with cheaper antacids. The constipating effect of aluminum hydroxide is a decided disadvantage. A case of intestinal obstruction has been reported. In searching for an ideal antacid we must seek one that does not have such discouraging and disagreeable side effects as this constipating action of aluminum hydroxide, which forces many patients to discontinue its use. We are not certain as to how aluminum hydroxide works. I do not think it works as an antacid. I think the effect obtained by aluminum hydroxide is due to its astringent action on the bowel wall. Aluminum hydroxide does not give a p_H of anywhere near 7, even when used in large amounts. Some of the good

results obtained in the healing of ulcers is due to the astringent action of the aluminum chloride formed; this must have the same astringent effect on the stomach as aluminum acetate preparations on cutaneous ulcers.

DR. E. N. COLLINS, Cleveland: Time will not permit adequate consideration of the many questions raised. Certain questions are answered in the manuscript. In answer to Dr. Greenwald's question, no patient in this series developed any tendency to alkalosis during treatment, which was one of the chief reasons for giving this report on the use of aluminum hydroxide. The question of the interference with the absorption of vitamins has received earnest consideration. We are using a much more liberal diet than we used previous to the use of aluminum hydroxide. Probably the most significant objective evidence which we can present from observations of more than 1,000 cases in which this form of treatment is administered is that the gain in weight per patient for a unit of time has been greater than while using any other antacid. A means of overcoming the mildly constipating effect of using aluminum hydroxide has been presented. The alleged instance of intestinal obstruction has been discussed by Dr. Clement R. Jones Jr. and Drs. V. C. Rowland and E. E. Woldman in communications to the Editor of THE JOURNAL, Dec. 9, 1939. In this instance adequate dilution in the drip method of treatment was not used. Morphine was given every four hours for several days. Many of the patients in this series had symptoms in remittent attacks for twenty years prior to the time treatment was started. Since this presentation was a factual report of results obtained, only certain references to the mechanism of action could be mentioned. Dr. Flexner asked about the use of antispasmodics. We always use antispasmodics during the first two or three weeks of treatment, until the patient becomes adjusted to his new form of living. The drip method was not used in over 10 per cent of the complicated cases, because several years ago we had trouble with several types of apparatus. We believe the physiologic principle back of this form of treatment is sound, and again we are using this method more frequently because of improvements in apparatus.

THE CUTANEOUS DIAGNOSIS OF GONOCOCCIC INFECTIONS

A FURTHER REPORT

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A person infected with a specific organism is in a state of hypersensitivity to that organism as long as it remains in the body.

The reaction of the skin to gonococcus toxin in persons infected with the gonococcus is a manifestation of allergy the exact nature of which is not known at present beyond the fact that it is a local tissue response between antigen and antibody. That this reaction denotes clinical specificity may be demonstrated by the passive transfer or Prausnitz-Küstner reaction first demonstrated in gonorrhea by Engel and Vigliani [1] in 1935. In a preliminary report a little later, the senior author also called attention to this proof of clinical specificity.

As early as 1909 Bruck [2] called attention to the fact that persons infected with the gonococcus showed an allergic reaction to the cutaneous application of killed gonococci similar to that shown by tuberculous persons to the Pirquet test. In the preliminary report published in 1936 the senior author [3] pointed out that by heating the standard bouillon filtrate in an autoclave at 15 pounds pressure for fifteen minutes for two periods, with an average temperature of from 115 C. to 120 C., the antitoxin-forming (thermolabile) substance was destroyed. After an extensive trial with the thermostable substance as an antigen we believe that it is inferior to the standard filtrate for eliciting a sharp cutaneous response. This was confirmed by Conrad [4] in 1936 and by Wishengrad [5] in 1939.

This cutaneous manifestation of allergy in specific gonococcic infections has been of considerable worldwide interest, especially the more when one considers that, beginning with Bruck in 1909, there have been throughout the world some forty-six contributors on this subject. Many different types of antigens have been used by the foreign contributors. They comprise whole gonococcus and many different kinds of extracts. The most popular, however, seems to have been a German-made preparation called "compligon," which was supposed to contain gonococcus toxin.

Heidenreich [6] in 1934, using gonargin (a polyvalent gonococcus vaccine) and compligon, reported reactions similar to ours, namely that twenty-four hours following an intracutaneous injection there appeared a central red papule surrounded by a diffuse red areola of the size of a one-mark piece (approximately 24 mm.) to the size of a five-mark piece (approximately 38 mm.). He calls attention to its value as a diagnostic aid in latent gonococcic infection.

In this country the papers of Conrad, Rossett [7] and Wishengrad are of recent date and of considerable interest. With the variance of workers and preparations it follows that a divergence of results occurred. Twelve of the contributing authors doubt the efficacy of this cutaneous test, whereas, on the other hand, nineteen authors not only state that it is of great value but claim that it is specific.

In 1930 Wolfgang Casper [8] stated that, by using a protein-free carbohydrate as an antigen, cutaneous reactions could be elicited in patients with gonorrhea. He further stated that this allergic reaction marked an advance in the diagnosis and prognosis of gonorrhea.

Conrad in 1936 reported a series of 100 cases: fifty negative and fifty positive results. In his "positive" group 98 per cent averaged a reaction measuring 2.32 cm. after forty-eight hours. In the "negative" (control) group 18 per cent revealed an average of 0.2 cm. reaction after forty-eight hours. He believes that coincidental infection neither modifies nor intensifies the cutaneous response in infected patients. He concludes that gonococcus filtrate (Corbus-Ferry) has a definite value as a cutaneous sensitization test for gonorrhea.

With the standard bouillon filtrate as the antigen, Wishengrad of the Central Gonorrhea Clinic in New York believes that there is a definite diagnostic value in the cutaneous test. He states that this procedure should be used primarily as an aid to diagnosis rather than as a diagnostic agent in itself. He further states

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Reproductions of the kodachromes and additional references to complete the bibliography on the subject are included in the authors' reprints.

1. Engel, Carl, and Vigliani, M. R.: Die Gonorrhoe als Testkrankheit bakteriell-allergischer Vorgänge, Wien. klin. Wchnschr. **48**: 48-51 (Jan. 11) 1935.
2. Bruck, C.: Deutsche med. Wchnschr. **35**: 470, 1909.
3. Corbus, B. C.: A Skin Test for the Diagnosis of Gonococcus Infections, J. Urol. **35**: 112-125 (Jan.) 1936.
4. Conrad, C. K.: Gonococcus Filtrate (Corbus-Ferry) as a Skin Sensitization Test for Gonorrhea, New York State J. Med. **36**: 1767-1768 (Nov. 15) 1936.
5. Wishengrad, Michael: Gonococcus Filtrate Test for Gonorrhea, Urol. & Cutan. Rev. **43**: 386-389 (June) 1939.
6. Heidenreich, Heinz: Die Intrakutanreaktion bei Gonorrhoe und ihre Bedeutung für die Diagnose, Dermat. Wchnschr. **99**: 1525-1532 (Nov. 24) 1934.
7. Rossett, N. E.: Skin Reactions to Extract Prepared from a Gonococcus Bouillon Filtrate, Yale J. Biol. & Med. **11**: 345-354 (March) 1939.
8. Casper, Wolfgang: Spezifische Cutireaktionen an Gonorrhoikern mit spezifischen, eiweissfreien Substanzen aus Gonokokken, Klin. Wchnschr. **9**: 2154-2158 (Nov. 15) 1930.

that in the proper evaluation of this test it is necessary to study a large number of both positive and negative reactions.

It is interesting to note that Rossett in this country during 1939 made use of Casper's suggestion and prepared an antigen derived from the fractional precipitation of the standard bouillon filtrate, which was reduced to a fine brown powder having characteristics of a polysaccharide. Rossett injected his antigen intradermally, using 0.1 cc. of 0.9 per cent saline solution containing 0.2 mg. of the powder. In 60 per cent (six of ten) of his acute cases his reaction consisted of more than 1 cm. of erythema and 0.5 cm. of induration. Similar reactions occurred in 39 per cent (twenty-two of fifty-six) of the chronic cases.

Since the original work on the cutaneous test was begun five years ago the efficacy of a positive reaction has already been established by finding the reaction positive in a large group of gonorrheal infections. The question constantly uppermost in our minds has been How can the specificity of this test be further demonstrated in regard to its negative phase in order to establish beyond a doubt its efficacy and reliability in the diagnosis of the oft encountered obscure case of gonorrhea? To further this end an additional study was made, the bouillon filtrate being used as an antigen and the broth medium as a control on fifty infected persons as encountered in public dispensary practice, on 100 noninfected students as a control series and on fifteen patients (duration of the disease varying from two months to one and one-half years) in private practice previously cured with the bouillon filtrate.

The additional fifty patients with known infection of two or more weeks' duration showed forty-five, or 90 per cent, positive results. Accurate measurements were taken of the reaction and kodachromes were made. These reactions were tabulated and an average dimension was calculated from the individual measurements. These were characterized by a central indurated area, the diameter of which averaged 1.7 cm., together with a concentric erythema which averaged 4.02 cm. in diameter. This test, as in other intracutaneous diagnostic procedures, should be read forty-eight hours following injection.

In the control series, performed on 100 students with a negative history of gonorrheal infection, 86 per cent gave negative responses. It is important to bear in mind Wishengrad's statement that one must see a large number of both positive and negative results before properly evaluating the two types of reaction. Seventy-five of the eighty-six exhibited merely a minimal central induration, varying from 0.5 to 1.5 cm., with no surrounding erythema. The remaining eleven showed the same central induration, but the induration was surrounded by varying shades of a very faint ghostlike erythema. Fourteen of the known negative cases gave a pseudopositive reaction; i. e., indurated areas without erythema, and erythemas without centrally indurated areas. The basis for these pseudopositive reactions in the control series does not appear entirely clear. It was at first suspected that they were due to an allergic state of the patient himself, which could be elicited in the history in several of the fourteen cases. This, however, was not in accord with the observations of an allergist who tested fifteen patients selected at random in private practice and noted no cutaneous response whatever.

Fifteen patients in our own private practice were encountered, all of whom were treated and "cured" with bouillon filtrate; 100 per cent of these cases gave the typical negative response.

Finally it is necessary to mention the patients who had been given sulfanilamide previous to their first appearance at the office. It was found that this form of chemotherapy frequently modified the intensity or caused the total disappearance of the expected cutaneous response.

SITE OF INJECTION AND METHOD OF INJECTION

Notwithstanding the fact that the majority of cutaneous tests are performed on the flexor surface of the forearm, we prefer to use the extensor surface of the upper arm. The skin is thicker at this point and the intradermal placement of the antigen more easily performed than in the area in which the epidermal layers are less well defined, as on the volar surface of the forearm. It is important to remember that injections of the antigen subcutaneously are of no value whatever.

The standard tuberculin syringe is employed with a special intracutaneous needle, preferably a 25 to 27 gage. The needle is introduced parallel to the surface of the skin, care being taken to advance the needle slowly, with the oblique side upward, penetrating the papillary layer to a depth of somewhat less than a millimeter. We inject 0.1 cc. of the standard filtrate and 0.1 cc. of the broth control—one about 3 inches above the other. When the injection has been correctly placed a wheal appears which is not translucent but white and sharply circumscribed, with a rose-pink border. The needle can usually be seen dimly through the epidermis.

EVALUATION OF CUTANEOUS TEST

We believe that the test should be employed primarily as a diagnostic adjunct and not as the sole means of diagnosis. It should always be accompanied by routine measures, such as smear, culture and complement fixation test when indicated. However, as already pointed out by Cumming and Burhans,[9] this intracutaneous (0.1 cc.) injection often causes stimulation of latent gonococcic foci, thus making it possible to obtain positive smears and cultures heretofore not demonstrable in a given case.

In addition we believe that this test may be used as a criterion for cure, because the cases herein presented in which cures were brought about all showed a typical negative response. This occurs because when the person is no longer infected with an organism he ceases to remain hypersensitive to that organism or its antigen. This test as a criterion for cure is not reliable in cases in which intensive chemotherapy has been employed until from three to four weeks after such treatment has been discontinued.

SUMMARY AND CONCLUSION

A person infected with a specific organism is in a state of hypersensitivity to that organism as long as it remains within the body.

In a control series of 100 persons known not to be infected with gonococci 85 per cent gave negative reactions to the cutaneous test described.

According to our experience, this test as a diagnostic adjunct in gonococcic infections is more valuable than any other procedure previously available.

636 Church Street, Evanston—55 East Washington Street, Chicago.

9. Cumming, R. E., and Burhans, R. A.: Experiences with the Gonococcus Filtrate (Corbus-Ferry) and Other Forms of Intradermal Therapy in the Treatment of Gonorrhea, J. A. M. A. **104**: 181-186 (Jan. 19) 1935.

ABSTRACT OF DISCUSSION

DR. MICHAEL WISHENGRAD, New York: I had no idea that the gonococcus filtrate was being used as a cutaneous test in gonorrhea as extensively as some clinicians have indicated to me in the past few days. I was pleasantly surprised at the fact that the test was not being found too difficult for practical purposes, which I at one time suggested. I also suggested that if one would take the trouble to learn what constitutes a positive and what constitutes a negative reading one would find that this test could be relied on. I agree with the warning that the test should be considered an aid rather than a diagnosis in itself. I have studied more than 500 cases. A negative test may mean as little as a negative Wassermann in the chancre stage. Each requires further checkup. A positive reading should serve more nearly as a probable diagnosis or at least should serve to increase suspicion in a particular case, so that repeated tests would be continued until a more definite diagnosis is made. Cases were diagnosed by smear and culture in several instances only after a positive cutaneous test indicated the need for repetition of these smears and cultures. If we ignore the doubtful readings, as I believe we should, we restrict the field of usefulness of this test only slightly. The acute cases may be negative in the early phases —perhaps in the first two weeks. This is true of the complement fixation test also. If positive (in the acute case) so much the better, but no reliance should be placed on a negative test at this stage. But it must be noted that the diagnosis in even the admittedly more difficult female cases is relatively easy in the acute stage by the usual bacteriologic means. As the proponents of the complement fixation test pointed out, so in the cutaneous test do we suggest greater value in the chronic case. Here we need help most, because of paucity of signs, or because superinfecting nongonococcus organisms becloud the picture. The test can be added to tests for determining cure. In my experience this test became negative before the complement fixation test did and was more reliable. I agree with the authors that sulfanilamide has beclouded the picture somewhat. I prefer not to use it in sulfanilamide cases. Cultures are not yet available to the private practitioner. Even in a big service like the New York City Health Department we don't get half enough.

DR. JOHN H. MORRISSEY, New York: Diagnostic tests for gonorrhea are completely unavailable. From that angle the work of the authors is important, but its inherent weakness lies in the fact that the test is likely to be valueless if sulfanilamide has been administered. We have to choose between an indeterminate test and the indeterminate results of sulfanilamide therapy. Perhaps most of us would prefer to take a chance, if we had to choose, on the sulfanilamide therapy and discard the test. The work of the authors is perhaps one step in that direction, but the well known criterion is the culture, and what is a $5 culture on these patients if they are going to stay thirty or thirty-five days in the hospital and then go out and reinfect somebody else, as I am sure a great many of them do. There should be some well defined and accepted standardized criterion of cure, possibly determined by the American Urological Association. The value of sulfanilamide therapy is diminished largely by the disarming effect of the drug on the urethral discharge and the other symptoms in the none too intelligent patient, in the type of patient seen in the municipal and charity hospitals, hospital wards and clinics. It has been my experience that perhaps less than 50 per cent of these patients are actually cured and I feel that the remainder are potentially infectious when they are discharged and there has been no further opportunity of checking on them. Attempts at legislative control of the venereal problem are futile, if negative smears merely are depended on as an evidence of cure. Negative cultures should be obtained and should establish cure in every case, regardless of the cost of the procedure, if the problem is to be handled in this way. The contribution of the authors to today's program will aid greatly in the attempt to control the disease at the source, namely in the chronic and cured infectious patients, particularly in permitting the patient to see that he is still uncured and can still transmit the disease.

DR. BUDD C. CORBUS SR., Chicago: In relation to the test and the use of sulfanilamide therapy, we have seen on several occasions that patients have had large doses of sulfanilamide who also on examination had profuse discharge with gonococci present. The cutaneous test was negative. We all know that the sulfanilamide derivatives impair the hemopoietic system in the body and it would be natural to expect this response. However, I would suggest that, when sulfanilamide therapy has been employed and a cutaneous diagnostic test is contemplated, one should wait from four to six weeks afterward until all the sulfanilamide is out of the patient's body; then one can determine whether the cutaneous test in the patient is positive or negative.

ANEURYSM OF THE VENTRICLE OF THE HEART

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The prevalence of coronary occlusion and myocardial infarction as a disease entity has led to widespread interest in this condition, its complications and the sequelae. Among the less common end results of infarct of the heart is the formation of ventricular aneurysm. Aneurysm of the ventricle may occur from causes other than infarction, namely from abscess of the heart wall, from trauma, from ulcerative lesions of bacterial endocarditis or from congenital defects. Instances of this type, however, are rare. The majority of ventricular aneurysms arise as a result of infarction following coronary thrombosis. Clinical interest in this problem has received stimulus from the fact that ventricular aneurysm can be diagnosed with accuracy before death and is known to be compatible in some instances with several years of reasonably active life. My purpose in this communication is to review the pathologic, clinical and roentgenologic features of ventricular aneurysm, to report the course of two patients in whom this lesion was recognized during life and to call attention to other conditions, particularly the rare occurrence of a syphilitic lesion, that may be mistaken for aneurysm of the ventricle.

Current interest in this subject is shown by the appearance in the recent literature of several papers dealing with various aspects of ventricular aneurysm.[1] The reader is referred to these for a discussion of historical aspects and references to the earlier literature. It is the roentgenologist who has made possible the accurate recognition of ventricular aneurysm during life. Steel in 1934 [2] emphasized the importance of roentgenologic, and particularly of fluoroscopic, examination in establishing the diagnosis. He pointed out that in the early stages bulging of the ventricle may be very slight and that an aneurysm can be present without showing up in the anteroposterior position, thus stressing the necessity of roentgen examination in various degrees of rotation. More recent publications likewise have noted the helpfulness of careful x-ray study in delineating aneurysm and differentiating it from the usual type of cardiac hypertrophy with dilatation.

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Read before the Section on Radiology at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

1. Parkinson, Bedford and Thomson.[4] Ball.[5] Berk.[6]
2. Steel, David: The Roentgen Diagnosis of Cardiac Aneurysms, J. A. M. A. **102**: 432-436 (Feb. 10) 1934.

PATHOLOGIC AND CLINICAL MANIFESTATIONS

The steps in the healing process that occur following myocardial infarction have been clearly defined recently by Mallory, White and Salcedo-Salgar.[3] Briefly stated, these consist in the replacement of necrotic muscle by connective tissue, which in turn becomes converted into a firm fibrous scar. The time at which this area "gives way" in the formation of an aneurysmal dilatation has not been clearly determined. Aneurysms of the ventricle have been found at autopsy as early as six weeks after coronary occlusion, though the average time at which they have been discovered clinically is much longer than this, as will be noted later on. The frequency with which aneurysm of the ventricle forms after coronary occlusion, again, is a point difficult to determine definitely. The various series which have been reported [4] indicate that among autopsies either aneurysm or aneurysmal dilatation is found in something like one out of every twelve or fifteen cases in which death does not occur soon after the first occlusion has occurred. It is not, therefore, a particularly rare condition. Its site in the ventricle will depend, obviously, on the location of the infarcted area. Just as the left anterior descending coronary artery is the vessel which most commonly shows complete occlusion, so aneurysms are found most frequently in areas supplied by this vessel, namely at the apex or anterior wall of the left ventricle. They occur much less frequently on the posterior wall and only rarely are they in the right ventricle. They may be of saccular form but more usually exist as a diffuse bulging, varying in diameter from a few centimeters up to a dilatation almost equal in size to the remainder of the ventricle.[5] The wall of the aneurysm commonly measures from 2 to 4 mm. in thickness. Representing as it does a thinned out, healed scar it is composed of dense firm fibrous tissue, occasionally showing a few remaining strands of muscle. There is often a calcium deposit both within the wall of the sac and in the blood clot that fills the aneurysm. Almost always the overlying pericardium is found to be densely adherent to the heart. There may or may not be hypertrophy of the remainder of the heart muscle. Study of the coronary vessels shows complete obstruction of the branch supplying the involved area and varying degrees of sclerosis and atheroma, at times with occlusion, in the other branches.

The diagnosis of ventricular aneurysm is based on three aspects: the clinical history and course, the physical examination and the roentgenologic study. While the last of these is by far the most important, each one may contribute in some measure.

HISTORY

There is almost always a history pointing to an attack of coronary occlusion at some time in the past. The time interval elapsing between this and the development or recognition of the aneurysm is variable. In the series reported by Parkinson, Bedford and Thomson [4] it differed all the way from three months in one case to seven years in another, the average time being seventeen months. Ball's case [5] was diagnosed as aneurysm of the left ventricle two and a half weeks after a severe attack of pain in the chest, though the patient six weeks previously had had a sensation of substernal pressure and difficulty in breathing. In two of the cases here reported the aneurysm was recognized in the first instance two years after the first coronary attack, and suspected in the other during the convalescence, the evidence of enlargement having been noted some eight to ten weeks after the occlusion. Obviously this time interval will depend on the accuracy and reliability of the history as well as the frequency and care with which examinations are made. Coronary occlusion not characterized by severe pain or other distinguishing features may be entirely missed in obtaining the patient's antecedent history.

There are two further points in the history that are of suggestive importance. Occasionally, as borne out in my two cases and others reported in the literature, patients with ventricular aneurysm give a story of recurrent prolonged precordial pain following the initial episode. This is not pain of short duration as seen in anginal seizures but distress lasting for hours or days. While it may be indicative merely of further infarction of heart muscle rather than of aneurysm formation, it has been noted commonly in the history of these patients. A second point worthy of mention is that these patients often have failed to observe the generally accepted period of from six to eight weeks of bed rest for convalescence and have resumed activity much sooner than this period after an obvious coronary attack. Whether the strain incident to such early activity has anything to do with causing aneurysm formation is perhaps speculative, though it has been suggested as a possible factor by some writers.[6] The experimental studies of Sutton and Davis [7] lend some weight to this possibility. These workers observed the changes in the heart of five dogs after ligation of the left descending coronary artery. One dog, allowed to rest for six days after operation before exercise was begun on a treadmill, showed subsequently at autopsy a small, well contracted scar without thinning of the ventricular wall. Four other dogs that were made to exercise within three days after operation were later killed and found to have thin ventricular scars with aneurysmal bulging.

The features in the history, then, of a previous attack of coronary thrombosis, of shortened convalescence following such attacks and of repeated episodes of prolonged pain are those which may lead one in a given case to suspect the possibility of ventricular aneurysm.

PHYSICAL EXAMINATION

Every one is cognizant of the bizarre precordial pulsations that may be found with any markedly enlarged heart. These are often very misleading and may cause one quite erroneously to suspect aneurysm. There are two unusual types of pulsation that can be of help in support of a clinical diagnosis. The first is a forceful, abrupt, localized thrust, often felt at the apex and caused, presumably, by the outward expanding pulsation of the ventricular bulge. Such an impulse was noted in case 1 of this article and was the first manifestation that led to the suspicion of aneurysm. The other type is a conspicuous, sometimes localized, pulsation felt medial either to the apex beat or to the outer border of cardiac dulness. This feature was notable in Ball's case.[5] It is important to note that, in contrast to this,

3. Mallory, G. K.; White, P. D., and Salcedo-Salgar, Jorge: The Speed of Healing of Myocardial Infarction: A Study of the Pathologic Anatomy in Seventy-Two Cases, Am. Heart J. **18**: 647-671 (Dec.) 1939.

4. Parkinson, John; Bedford, D. E., and Thomson, W. A. R.: Cardiac Aneurysm, Quart. J. Med. **7**: 455-478 (July) 1938.

5. Ball, David: Aneurysm of the Heart, Am. Heart J. **16**: 203-218 (Aug.) 1938.

6. Berk, L. H.: Cardiac Aneurysm, Am. Heart J. **17**: 569-580 (May) 1939.

7. Sutton, D. C., and Davis, M. D.: Effects of Exercise on Experimental Cardiac Infarction, Arch. Int. Med. **48**: 1118-1125 (Dec.) 1931.

pulsations in some cases of aneurysm may be surprisingly slight, on physical examination as well as fluoroscopically. The heart sounds, as a rule, are muffled and diminished out of all proportion to the force of the cardiac impulse. Gallop rhythm is frequently to be heard. There is nothing distinctive about murmurs —they may or may not be present. The blood pressure, while occasionally elevated, is commonly normal or low. In the series of cases reported by Parkinson and his associates [4] the average reading was 130 systolic, 75 diastolic.

Electrocardiograms are of importance only as they may add to the evidence of myocardial infarction and assist in localizing the lesion in the anterior or posterior part of the ventricle.

ROENTGENOLOGIC FEATURES

The greatest help in the examination comes from careful roentgenologic study. It is the x-ray examination more than anything else that has taken ventricular aneurysm from the sphere of pathologic curiosities and made it a recognizable condition of clinical interest. In ventricular aneurysm one usually sees by x-ray examination not only cardiac enlargement, which is nearly always present, but an abnormal contour of the heart, commonly with sharply defined ledging of the ventricular border. The aneurysm appears as a bulge rather than as a hump on the surface of the ventricle. It is generally of the same density as the cardiac silhouette, though in some instances it is conspicuously lighter (fig. 5). This bulge may be missed if the patient is viewed only in the anteroposterior position, and careful study by fluoroscopy, especially in the oblique position, may reveal what is in no wise evident in the routine heart film. By fluoroscopy also one may get important information regarding pulsations. Localized aneurysms may show a paradoxical type of pulsation, expanding outwardly as the ventricle contracts. This feature of the fluoroscopic examination is particularly important to look for. While it is not pathognomonic of aneurysm as distinct from all other lesions (case 3) it indicates a weakened area in the ventricle. Such a paradoxical movement may be recorded in some instances by kymogram, but this affords help only as a permanent record of what can be seen much more satisfactorily by the fluoroscope. In contrast to this type of localized pulsation, a greatly diminished or feeble beat may be observed in larger aneurysms or those filled with a blood clot. In such instances the unusual contour of the heart produced by the bulge of the ventricular wall is much more to be relied on than the pulsation. As pointed out by Steel,[2] if conditions are such that bulging of the thin walled ventricle is very slight there may be insufficient abnormality in the cardiac silhouette to lead to recognition of the lesion by x-ray examination. Again, apical aneurysms may be difficult to visualize because the bulge may be obscured by the shadow of the diaphragm. Calcification within the wall of the aneurysm or in the clot which it contains may be of aid in diagnosis.

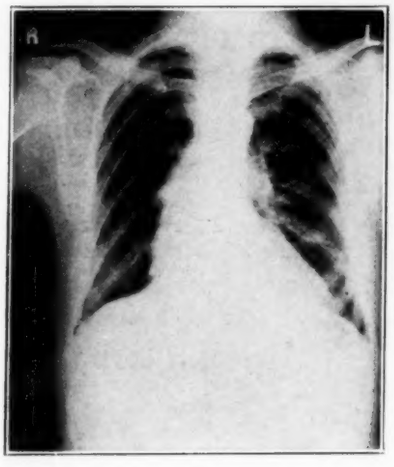

Fig. 1 (case 1).—Postero-anterior view Nov. 14, 1938. Note cardiac enlargement and tortuous aorta. Evidence of aneurysm is lacking in this view, though the left ventricular contour is straighter than usual.

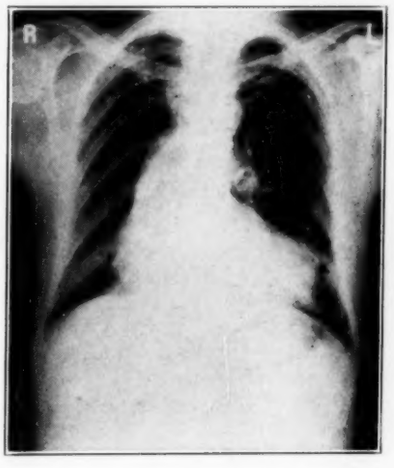

Fig. 2 (case 1).—Appearance May 16, 1939. Note increase in cardiac enlargement and bulge at apex (outlined by arrows) which showed marked outward expansion during systole.

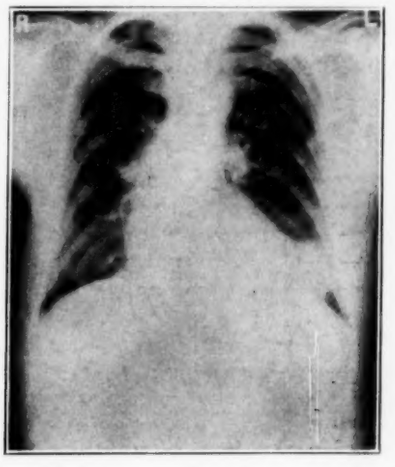

Fig. 3 (case 1).—Appearance Jan. 18, 1940. Note marked increase in size of aneurysm at apex.

LIFE HISTORY

The patient with this condition has an extremely variable course, just as is true in any instance of coronary artery obstruction. His life is hazardous, subject always to further coronary attacks, to anginal seizures or to the development of congestive failure. Some patients, however, do surprisingly well and may live and remain ambulatory for a period of several years. In Parkinson's series of fifteen patients the length of life for the group averaged about two years after the first attack of coronary thrombosis. This average, among the patients who died, was made up from extremes varying between nine months and five years. One of his patients was still alive and doing fairly well after an interval of seven years. It is a point of considerable interest that these individuals rarely die as a result of rupture of the aneurysm. While this occasionally occurs, rupture is much less common as a cause of death than is gradually increasing cardiac failure or cerebral embolism from a dislodged fragment of clot. The occurrence of rupture of the heart wall following coronary occlusion is much more likely to take place during the first two weeks when necrosis and softening of the heart muscle are most marked.[8]

REPORT OF CASES

Within the course of six months, two patients with ventricular aneurysm were observed in the wards of

8. Fulton, M. N.: Acute Hemopericardium: Its Causes and Clinical Manifestations, M. Clin. North America, September 1940. Mallory, White and Salcedo-Salgar.[3]

the Peter Bent Brigham Hospital. Each one of these illustrates some of the features of this condition that have been noted.

CASE 1.—J. L., a Russian born tailor aged 56, was admitted in November 1938 because of an acute gastrointestinal upset which had come on following the excitement and indulgence incident to his son's wedding festivities. We subsequently learned from the records of another hospital in Boston the following interesting details of his story: In 1935 he began having attacks of angina pectoris. At that time he had slight cardiac enlargement and a blood pressure varying between 180 and 210 systolic. He was able to continue irregularly at his work until December 1936, when an episode of prolonged severe substernal pain occurred. This led to his admission to a hospital, where the clinical examination left no doubt about the diagnosis of coronary thrombosis. It was noted at that time that the heart was slightly enlarged, but it showed no particular abnormality of the beat as determined by palpation. The sounds were described as being of very poor quality. He stayed in the hospital for six months owing to the fact that he consistently had an elevated pulse rate, occasionally a slight fever and recurring attacks of precordial pain and finally because of the occurrence of paroxysmal dyspnea and other signs of congestive heart failure. During the greater part of this period of six months his prognosis was looked on as being very poor. This was early in 1937. He was discharged in June and continued his convalescence at home, though its course there was interrupted by episodes of severe paroxysmal dyspnea. By June 1938 he was able to walk a half mile or so without ill effect unless he hurried. Much effort was likely to bring on substernal pain and dyspnea.

When he was first seen by us two years after his coronary thrombosis, we could not help but be impressed by the extraordinary impulse palpable in the apex region of the heart. It was a forceful thrust of a most unusual kind—as though a part of the heart were forced out between his ribs with each beat. It was most marked in the fourth left interspace directly above the nipple. The patient said that he had noticed this beating even through his coat for a period of several months. There were systolic and diastolic murmurs over the heart but no objective signs at the time of congestive failure. The blood pressure varied between 170/120 and 135/85 mm. of mercury; venous pressure in the arms measured 95 mm. of water; the vital capacity was 2,300 cc.; the Wassermann and Hinton reactions were negative. An x-ray film showed the heart contour seen in figure 1. By fluoroscopy one could see an outward systolic pulsation near the apex of the heart corresponding to the abrupt pulsation of the chest wall. Electrocardiograms showed curves consistent with an anterior infarction. We felt that the patient had an aneurysm of the apex of the left ventricle coming to light approximately two years after his first attack of coronary occlusion but probably being present for a good many months. The unusual pulsation which he had is not an uncommon finding in cardiac aneurysm as just noted and was the feature here which first suggested the diagnosis. He was discharged after a few days but has been seen at frequent intervals since.

In May 1939 an x-ray film (fig. 2) showed greater enlargement of the heart and the bulge of the aneurysm could be plainly seen. At the present time his activity is limited, but he is ambulatory and able to walk several blocks if he does not hurry. Exertion brings on considerable breathlessness, but he is relatively free from angina. A repeat x-ray examination made in January 1940 (fig. 3) showed a definite increase in the size of the rounded prominence at the apex of the left ventricle. This area still shows a marked systolic expansion while the adjacent ventricle is in contraction. No calcification is seen in the aneurysm. The blood pressure is 160/100. The lungs have remained clear and no pitting edema has developed. Physical examination of the heart still shows the extraordinary forceful impulse in the apex area and a to and fro murmur at the base. He takes a maintenance dose of digitalis each day and theobromine three days out of seven.

This case illustrates the classic type of apical aneurysm. It has now been three and a half years since the coronary occlusion occurred. The aneurysm was first recognized by physical examination eighteen months ago, two years after the occurrence of coronary occlusion.

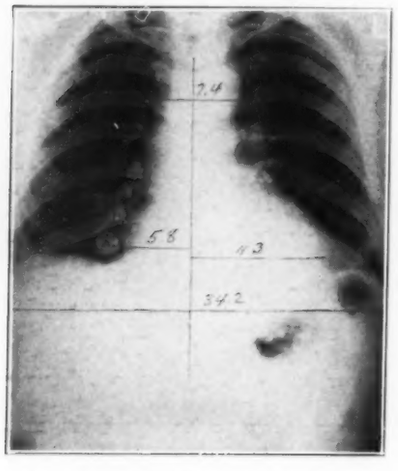

Fig. 4 (case 2).—Appearance July 7, 1938, showing cardiac enlargement but no evidence of aneurysm which arose from posterior wall of the heart.

Fig. 5 (case 2).—Left anterior oblique view taken July 7, same time as the view shown in figure 4, showing bulge (outlined by arrows) projecting from the posterior surface of the heart and exhibiting fluoroscopically a feeble pulsation.

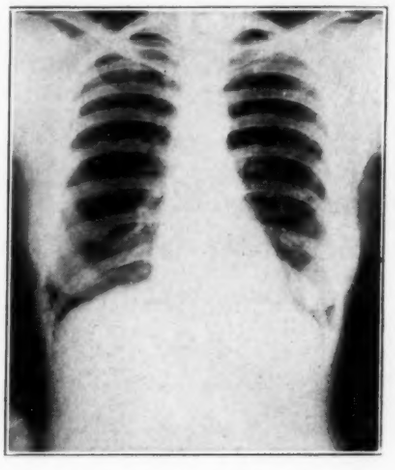

Fig. 6 (case 3).—Appearance Nov. 2, 1937, showing normal heart shadow fourteen months before cardiac pain began. This film was taken to rule out pulmonary tuberculosis.

CASE 2.—R. S., a business executive aged 55, was seen at the Peter Bent Brigham Hospital in May 1938. Dr. Frank T. Fulton of Providence, R. I., and Dr. Samuel A. Levine of Boston furnished the following notes concerning his antecedent history over a ten year period: He was first seen in 1928 because of mental depression. At this time there was no cardiovascular abnormality. Five years later he had an attack of substernal pain for which his local physician put him to bed. The pain was in the upper part of the chest, radiated to the arms and was associated with sweating and marked prostration. He stayed in bed for only four or five days, insisting on resuming activity earlier than was advised. Six weeks later he had another attack of severe substernal pain, following which he fainted and was subsequently in collapse. At this time the heart exhibited no precordial impulse that could be seen or felt. It did not seem enlarged and had a regular action with a rate of 90, and there were no murmurs. The blood pressure was 115/70; there were rales at both lung bases. The diagnosis seemed clearly to be coronary occlusion, and this was confirmed

by an electrocardiogram. Following this the patient remained at bed rest for eight weeks.

It was during this convalescence that a very considerable increase was noted in the heart size. Whereas at the time of the first attack of pain there had been no demonstrable cardiac enlargement, two months later the heart was definitely enlarged and the whole left side of the chest moved with each beat. There were no murmurs, and the heart sounds were clear and of fairly good character. Because of the marked increase in the size of the heart it was believed that dilatation of the ventricle and thinning of the wall had occurred and the possibility of rupture was feared. The patient made a satisfactory convalescence, however, and was able to return to his work in the summer of 1933, to walk as much as a half mile without disturbing breathlessness or pain and during the following year to be at his office each day from 9 to 6 o'clock. It was noted repeatedly during that year that the precordial pulsation was diffuse, lifting the chest wall with each impulse. Two years later (1935) he had a return of precordial pain and at one time paroxysmal tachycardia shown by electrocardiograms to be of auricular origin. In May 1937 the cardiac impulse was described as neither vigorous nor violent but palpable over an area some 5 to 6 cm. in diameter, lifting the chest wall with each beat. At this time the first opportunity occurred for fluoroscopic study. The heart, as was evident on physical examination, was considerably enlarged. In the left anterior oblique position a large bulge could be seen about the size of an orange projecting from the posterior surface of the left ventricle. This bulge was continuous with the heart shadow but appeared distinctly less dense. Cardiac pulsations could be visualized but poorly throughout.

The interpretation of these manifestations was that the patient had a large aneurysm of the left ventricle extending posteriorly. In the absence of any recent change in his progress or physical examination, it seemed quite probable that the aneurysm had been present for several years, very likely having formed soon after the first attack of coronary thrombosis four years before and explaining the unusual impulse which had been noted over his heart then and during the intervening years. It is interesting that at this time (1937), as had been true since his first acute attack, his blood pressure was low, 100/70. There were no murmurs and the lungs were free from rales. Examination at the Peter Bent Brigham Hospital confirmed these observations and x-ray films (figs. 4 and 5) showed the enlarged cardiac silhouette and the unusual prominence which had been noticed by fluoroscopy extending backward from the posterior surface of the heart. (The lack of evidence of aneurysm here in the anteroposterior view emphasizes the great importance of looking for this lesion fluoroscopically with the patient in different degrees of rotation.) Electrocardiograms showed changes in the T waves, most marked in leads 2 and 3, pointing to a posterior infarction.

The patient lived until August 1938, which was five and a half years after his first coronary attack. During the last year of his life he had recurrent anginal seizures and occasional attacks of paroxysmal dyspnea. It is of interest that his pain often would come on when he was sitting down and would disappear when he stood up. He noticed this so regularly that he took to doing his work at the office standing at a drawing board. His death occurred presumably from congestive heart failure, following the development of more frequent and severe attacks of paroxysmal dyspnea. Unfortunately there was no postmortem examination.

This case illustrates several of the features of cardiac aneurysm noted: (1) the history of repeated attacks of pain occurring in this instance with a short convalescence following the first coronary attack; (2) the type of aneurysm arising from the posterior wall of the left ventricle definitely recognizable only by x-ray examination; (3) the duration of life for five years from the time when it seems extremely likely that the aneurysm first formed.

DIFFERENTIAL DIAGNOSIS

A detailed account of differential diagnosis of cardiac aneurysm would include a number of conditions such as an enlarged pulmonary conus, a syphilitic aneurysm of the descending aorta or loculated pericardial effusions or cysts. Many instances of cardiac hypertrophy and dilatation, particularly those seen following coronary occlusion, may present features suggestive of aneurysm. There is one condition which, though rare, simulates aneurysm of the heart and may be so misdiagnosed, namely the occurrence of a localized syphilitic lesion of the heart wall. It is important to differentiate this condition because antisyphilitic therapy may lead to great improvement. An illustration of such a lesion is offered by the following unusual case recently observed at the Peter Bent Brigham Hospital:[9]

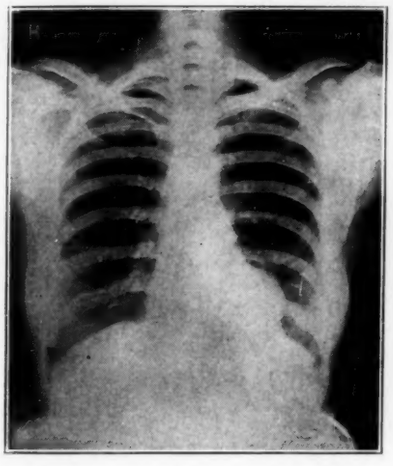

Fig. 7 (case 3).—Appearance March 16, 1939. Note rounded hump on left ventricular border of normal sized heart. This showed a marked expansile pulsation during systole.

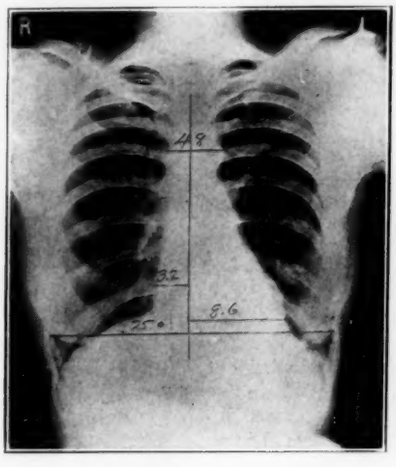

Fig. 8 (case 3).—Appearance May 25, 1939, six weeks after antisyphilitic treatment was started. The diminution in the size of the ventricular bulge may be due in part to exposure of the film during diastole.

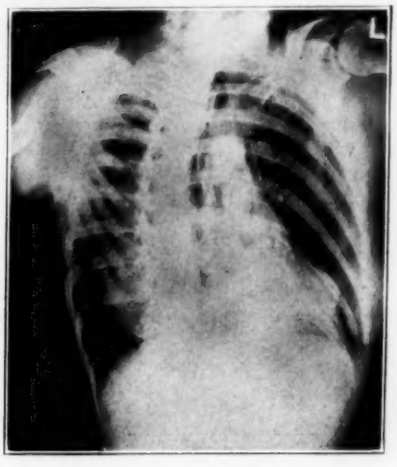

Fig. 9 (case 3).—Right anterior oblique view May 25, same time as view shown in figure 8, showing the hump on the left ventricular border.

CASE 3.—M. A., a housewife aged 41, complained in March 1939 of easy fatigue, vomiting and pain over her heart, all of which she had noted for about two months. A year and a half before she had been seen by her physician because of weakness. An x-ray film of the chest taken at that time to rule out tuberculosis (fig. 6) revealed a heart of normal size and contour and no abnormality in the lungs. The pain of which she now complained had come on following a mild respiratory infection

9. Dr. Rowland Parris of Falmouth, Mass., and Dr. Julius G. Kelley of Pocasset, Mass., furnished notes on this patient and some of the x-ray films shown in figures 6 to 11.

with cough. She described it as a dull, continuous ache over the entire precordial area, radiating to the left shoulder and down the left arm, intensified at times—both when she was quiet and when she was exerting herself or moving about—by a sharp, stabbing sensation of the same distribution. It had never been of the severe agonizing type seen in coronary occlusion but had been such as to incapacitate her and keep her awake at night. She had also noted that relatively little effort made her distinctly short of breath. She had observed no edema and had been able to lie flat in bed without any difficulty in breathing. She also complained of gaseous eructations and vomiting of gradually increasing frequency. There had been a loss of about 20 pounds (9 Kg.) during the past year.

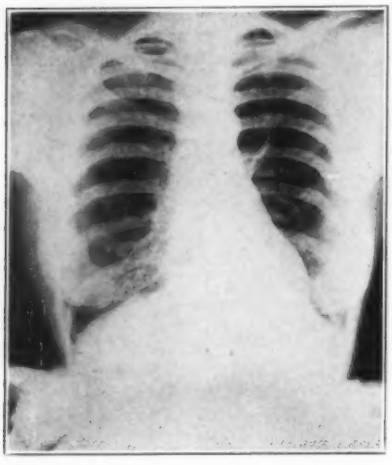

Fig. 10 (case 3).—Appearance April 1, 1940, thirteen months after antisyphilitic therapy was started. Compare with figure 6. The heart is slightly larger but the contour is practically normal.

The unusual feature on physical examination was a diffuse impulse felt all over the precordium and extending upward into the upper left thorax. The heart seemed normal in size and was slow and regular and without murmurs. The blood pressure was 100/70. The nature of her trouble was entirely obscure until roentgen examination of the chest showed the unusual appearance of the heart shadow as seen in figure 7. This disclosed a remarkable rounded hump on the left ventricular border of an essentially normal sized heart. By fluoroscopy this hump could be seen to have an extraordinarily expansile pulsation, bulging outwardly to an extreme degree with each contraction of the ventricle. The fluoroscopist expressed concern that the lesion might rupture at any moment. This finding ruled out the possibility of a solid tumor and led to the presumptive diagnosis of ventricular aneurysm of an unusual type. Against the diagnosis of the common type of ventricular aneurysm was (1) the absence of any history pointing to coronary occlusion, (2) the continuous, persistent pain of two months' duration and (3) the x-ray finding of a fairly sharp, localized hump rather than a bulge, and that on the border of a normal sized heart. The likely possibility of a syphilitic lesion was not suspected until a routine Wassermann test was reported as strongly positive. A second Wassermann test confirmed this finding. The subsequent course points strongly to the diagnosis of a localizing syphilitic lesion of the heart wall. The patient was started immediately on potassium iodide and injections of bismuth. Within three days the elevated temperature that she had been having dropped dramatically to normal and within the month that she remained in the hospital her precordial pain gradually and entirely disappeared. She was seen again a month after discharge. There had been no return of her pain, and examination showed scarcely any palpable impulse over the precordium. By x-ray examination (fig. 8) the lesion appeared smaller in the anteroposterior view, though still quite prominent in the oblique position (fig. 9). It still exhibited on fluoroscopy a clearcut expansile pulsation with each systole. Following discharge from the hospital the patient was given antisyphilitic arsenicals, and these were continued until December 1939. Subsequently she has received more injections of a bismuth compound. We were informed by her doctors that the pain which she had in her chest and the dyspnea had not returned. An x-ray film taken April 1, 1940, showed almost complete disappearance of the bulge on the ventricular wall (fig. 10), though in the oblique view (fig. 11) there is still evident a slight prominence at the site of the original lesion. Fluoroscopically, one can still detect a paradoxical pulsation in this area, with outward thrust during systole, though this is greatly diminished in excursion from that observed originally.

Fig. 11 (case 3).—Appearance April 1, 1940, same time as view shown in figure 10. Note persistence of small hump at site of original lesion. This still shows outward expansion fluoroscopically during systole.

Figure 12 shows the electrocardiograms taken during the first three months of observation and recently. The inverted T wave in lead 1, which became diminished in depth during the first two months of treatment, is now upright. There is a comparable diminution in the excursion of the inverted T wave in lead 4.

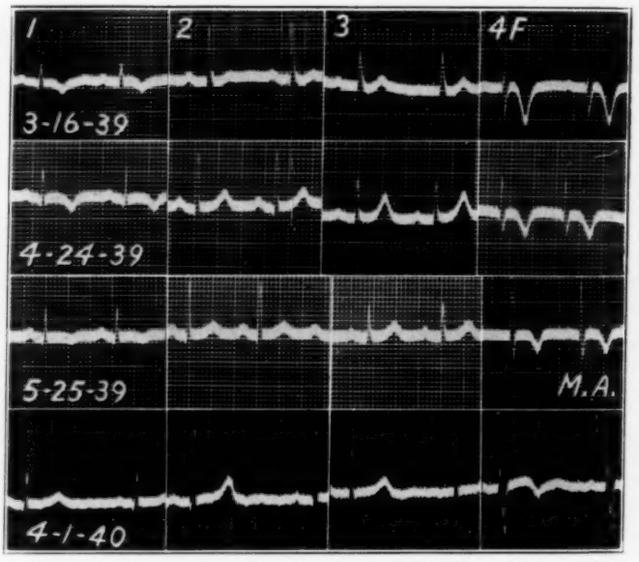

Fig. 12 (case 3).—Standard and precordial leads taken at various intervals. Note change in T_1 from inverted to upright direction, and diminution in the excursion of inverted T_4.

SUMMARY

Aneurysm of the ventricle of the heart occurs occasionally as a sequel to myocardial infarction. While the diagnosis may be suspected in patients who have had coronary occlusion and who present unusual precordial pulsations, it depends in the main on the changes seen on roentgenologic examination. The features here are (1) cardiac enlargement plus a silhouette of abnormal contour with a bulging or ledging of the ventricular border; (2) at times decreased density of the aneurysmal shadow compared to the rest of the heart; (3) either a paradoxical pulsation with outward expansion of the aneurysm during systole or a diminished feeble beat in the aneurysm compared to that seen in other parts of the ventricle; (4) calcification within the wall of the aneurysm or in the clot which it contains.

Patients may live for several years with ventricular aneurysm and enjoy a life of reasonable though limited activity. They rarely die as a result of rupture of the heart.

Three cases are reported: One patient with an apical aneurysm is still alive eighteen months after the lesion was first recognized; one patient with a large posterior aneurysm lived five years after the probable time of its formation, and one patient with a localized syphilitic lesion of the ventricle had a mistaken diagnosis of aneurysm and has greatly improved with antisyphilitic therapy.[10]

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ABSTRACT OF DISCUSSION

DR. WILLIAM J. KERR, San Francisco: Over a period of many years I have had the opportunity to see a number of patients who present some of these features. The changes, first in the fluoroscopic examination of the patient and sometimes in films, are striking and should make one suspect that one is dealing with a bulging of the ventricular wall due to aneurysm. Too often it has been put down as a dilatation of the ventricular wall associated with long-standing hypertension and hypertrophy which preceded the dilatation, as all have seen at autopsy the thinning of the ventricular wall with flattening of the columnae carniae and papillary muscles. One should not wait for the pathologist to make this diagnosis, because Dr. Fulton has pointed out the criteria on which this condition should be suspected and in the more advanced cases the features by which it should be diagnosed. I have been very much impressed by the abnormality of the pulsations seen in such cases. They may be very marked, they may be expanding in the region of the apex of the heart, or they may be the so-called paradoxical type of pulse. In some of the patients I have seen over the years, when the aneurysm is suitably situated there may be a pulsation well inside the left border of what seems to be the cardiac dulness where the aneurysmal sac apparently did not bulge out during systole but where the contracting or active muscle came up against the chest wall well inside the left border. This characteristic should make one suspect this condition, which could differentiate from pericardial effusion on the quality of sounds, and so on. As Dr. Fulton has pointed out, however, the x-ray examination is most helpful in establishing the diagnosis. I suspect from my own experience, which Dr. Fulton may wish to discuss in more detail, that this aneurysm arises rather early in the course of coronary occlusion, that perhaps it arises in the first two or three or four weeks or begins at that stage, and with progressive attacks of coronary occlusion or extension of the process this condition probably becomes more marked. If the aneurysmal sac is next to the diaphragm or against structures where adhesions and fibrosis will be marked, there is not much likelihood of its being progressive unless the coronary occlusion is repeated time and again. My first impression was that this was probably a gummatous process which was bulging outside as well as inside the chamber of the heart at that early stage. However, the subsequent films indicate that there is some bulging, but it is quite likely that it was an extensive gummatous process there which is seen occasionally in the heart of the untreated syphilitic patient at autopsy.

DR. EMANUEL LIBMAN, New York: The frequency of aneurysm of the left ventricle is greater than has been believed. Dr. Kerr has brought up the question How soon can an aneurysm develop? The necrosis occurs and then healing, and in the course of time the involved part is bulged out. But the aneurysm may develop because of the necrosis itself before there is any real fibrosis. With Dr. Benjamin Sachs I have put on record one case in which an aneurysm developed within eleven days after occlusion, there being present an extensive area of necrosis reaching the pericardium. In 1912 I pointed out that not infrequently the diagnosis can be made by feeling a pulsation between the apex and the sternum, the pulsation at the apex being slightly or not at all palpable and a poor first apical heart sound being present. It is risky to employ this method if the first sound it good. An aneurysm may be present in association with a readily heard first apical sound, but under such conditions I advise against drawing conclusions. I will cite a case in which the diagnosis was based on this method alone: A patient suffering from a ureteral calculus was sent to me for an opinion concerning operative intervention. On palpating the cardiac area I found an aneurysm. I advised against removal of the calculus. The electrocardiogram showed only slight changes. That was in 1934. Cardiac symptoms were not present and there was no history of any. The diagnosis was not accepted and no special care was given to the patient. In 1936 edema of the legs developed, later a systolic murmur, and the aneurysmal pulsation covered a large area. The patient died in 1938 after repeated attacks of heart failure and the development of definite electrocardiographic changes. Some years ago the late Dr. Hermann Mond, at my suggestion, made fluoroscopic studies in a large number of cases. He found three signs that could be present: (1) weak movement of the whole border of the left ventricle, (2) a seesaw motion, the aneurysmal part being bulged out, the rest of the border being drawn in, and (3) an absence of pulsation of part of the border. This last sign was found to be the best evidence of the presence of an aneurysm. It was present in Dr. Fulton's cases. There are at least two conditions in which fluoroscopy or, still better, roentgenkymography is very important. A number of patients who appear to be suffering from a first attack of occlusion have already had one or more previous attacks, latent or unrecognized. There is, of course, a difference in the prognosis and in the length of time for bed rest. Roentgenkymography can aid by revealing an aneurysm, which points to an early infarction. A patient may suffer an occlusion, with electrocardiographic evidence, and later changes may disappear.

DR. SIMON DACK, New York: The fluoroscopic examination is of value not only in the diagnosis of cardiac aneurysm following coronary occlusion but also in the diagnosis of cardiac infarction even when there is no evidence of enlargement or bulging of the left ventricular contour. Dr. Fulton has described the abnormalities in pulsations in ventricular aneurysms. These are (1) an expansile or paradoxical movement of the left ventricular contour and (2) a marked diminution in amplitude of pulsation. These abnormalities in pulsation may be observed also in cardiac infarction even in the absence of a localized bulge. Thus in several hundred cases of cardiac infarction following coronary occlusion studied at the Mount Sinai Hospital, many of which were checked by roentgenkymography, it was found that at least one half showed a systolic expansion or a paradoxical movement of the left ventricular contour, and about one fourth showed a very marked diminution of pulsation. In other words, the area of infarction behaves functionally as an aneurysm. The value of fluoroscopy lies in the fact that the x-ray film may show a heart of normal size and contour without any evidence of localized dilatation. Furthermore, the electrocardiogram following recovery from the attack of coronary occlusion may no longer be typical of infarction or may even return to normal. Observation of the ventricular pulsations in such cases may often be diagnostic.

DR. MARSHALL N. FULTON, Boston: Dr. Kerr has raised the question which Dr. Libman has also touched on as to the most likely time in which the aneurysm may form following coronary thrombosis. Some light has been shed on this question by the recent studies published in the *American Heart Journal* by Drs. Mallory, White and Salcedo-Salgar, who made careful microscopic studies of the heart muscle following coronary occlusion, finding that evidence of necrosis may be detected as early as six hours following coronary obstruction and that the maximum period of necrosis in the heart muscle will be found from four to six days following occlusion. That means that the time in which weakening of the heart muscle is most marked is during the first two weeks. It is known that in this two weeks period the majority of instances of rupture of the heart following coronary occlusion occur. As Dr. Libman pointed out, cases have been recognized of ven-

10. Since the submission of my paper, an excellent review of the subject of aneurysm of the heart has been published (Dressler, Wilhelm, and Pfeiffer, Robert: Cardiac Aneurysm: Report of Ten Cases, Ann. Int. Med. **14**: 100-121 [July] 1940).

tricular aneurysm during the first two weeks following coronary occlusion, and other cases have been observed over a period of a month or two months. The average length of time in the series that has been reported is a longer period than that. As stated, it will depend on the frequency of examination and the accuracy of the history that the patient gives. I think it is important to emphasize that when the aneurysm involves the portion of the ventricle buried in the diaphragmatic shadow there may be no demonstrable bulging in the x-ray film. Dr. Steel of Cleveland pointed this out clearly in a paper published in THE JOURNAL some years ago. My experience with kymographic study has been that it affords a permanent record of what can be seen on fluoroscopy, but, as far as ventricular aneurysms go, it has not contributed more than that.

PRIMARY EPITHELIOMA OF THE URETER

EDWARD N. COOK, M.D.
AND
VIRGIL S. COUNSELLER, M.D.
ROCHESTER, MINN.

Carcinoma at any situation in the urinary tract is most serious, and the question of cure is controlled largely by the same factors which govern the cure of cancer in any other organ; namely, early diagnosis and radical treatment by surgery, radium and roentgen rays. Furthermore, the chance of cure is greater if the lesion originates in any portion of the urinary tract that can be completely removed surgically, together with all associated lymphatic vessels. Radical procedures instituted to eradicate any malignant process are always more favorable in the early small lesion of slow growth and are less favorable as the lesion extends and also if it is of greater activity.

Our experience in eighteen positively proved cases of this disease has served to emphasize certain points in diagnosis and surgical management which we have noted are extremely essential if a higher percentage of cures are to be effected than has been the case in the past.

In 1842 Rayer [1] reported the first case of primary carcinoma of the ureter. In 1878 Wising and Blix [2] found the condition at necropsy and noted metastases to the colon, mesentery, peritoneum and liver. Albarran [3] in 1902 mentioned a case in which what he called "papilloma of the ureter" had been diagnosed preoperatively and confirmed by operation, by his master, Le Dentu, and himself in 1899. Since that time reports of cases have occurred sporadically in the literature, and Aschner,[4] followed by Rousselot and Lamon [5] and later by Mackenzie and Ratner,[6] have collected these in a group. Mackenzie and Ratner reported sixty-two cases in 1932. Since that time various cases have appeared in the literature and we add eighteen more seen at the Mayo Clinic during the past nineteen years.

From the Section on Urology (Dr. Cook) and the Division of Surgery (Dr. Counseller), the Mayo Clinic.

Read before the Section on Urology at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

1. Rayer, P., cited by Rousselot and Lamon.[5]

2. Wising, P. J., and Blix, C.: Cancer of Ureters and Secondarily of Mesentery, Hygiea **40**: 468-476, 1878.

3. Albarran, M. J.: Adénome de l'uretère; extirpation; guérison, Bull. et mém. Soc. d. chirurgiens de Paris **28**: 838-844 (July) 1902.

4. Aschner, P. W.: Primary Tumors of the Ureter, Surg., Gynec. & Obst. **35**: 749-758 (Dec.) 1922.

5. Rousselot, L. M., and Lamon, J. D.: Primary Carcinoma of the Ureter: Report of a Case and a Review of the Literature, Surg., Gynec. & Obst. **50**: 17-28 (Jan.) 1930.

6. Mackenzie, D. W., and Ratner, Max: Metastatic Growths of the Ureter: A Brief Review of the Literature and a Report of Three Cases, Brit. J. Urol. **4**: 27-35 (March) 1932.

ETIOLOGIC CONSIDERATIONS

The incidence of this disease is no doubt more frequent than the reports in the literature would indicate. Before the advent of urography and particularly excretory urography, many instances of epithelioma of the ureter went undiagnosed. Since more nearly exact methods of diagnosis have been used, there has been a relatively much greater number of such cases reported during the past ten years. Gilbert [7] stated that in a series of 22,810 necropsies performed at Bellevue Hospital in New York from 1904 to 1935 there was only one instance of primary epithelioma of the ureter proved at necropsy. There were no records in the clinical files of Bellevue Hospital of such a case. In a series of 16,565 malignant tumors encountered at the Memorial Hospital, Pack and LeFevre [8] apparently did not find any primary ureteral malignant growths.

The usual incidence of age in these cases varies from the fourth to the eighth decade and the average age in Gilbert's series of forty-one cases collected from the literature was 57 years. In our series the youngest patient was 37 years of age and the oldest patient was 71. The average age (for our series) was 56.1 years. There is no particular incidence by sex when the whole series of reported cases is considered, but there seems to be a somewhat greater prevalence of the condition among male persons. There were sixteen male and two female patients in the group of cases we are reporting.

Fig. 1. — Gross specimen, showing epithelioma of the lower part of the ureter, with secondary dilatation of the ureter above the site of the lesion.

PATHOLOGIC CONSIDERATIONS IN RELATION TO RESULTS

The eighteen cases reported in this paper represent proved instances of primary epithelioma of the ureter. In each of them the kidney on the same side was carefully examined and no evidence of tumor was found in the renal pelvis. In five additional cases the diagnosis was primary epithelioma of the ureter but at operation the primary lesion was found to be a tumor of the renal pelvis. In another case a diagnosis of epithelioma of the ureter was made, but, because of the advanced age of the patient and the patient's general debility, surgical treatment was not advised.

All the tumors were graded according to the classification of Broders for vesical tumors: one was grade 1, nine were grade 2, seven were grade 3 and one was grade 4. In analyzing the results obtained in the treatment of tumors of various grades, the type of treatment instituted must be considered. Of the ten patients who had grade 1 or grade 2 tumors, one is living nine years, two are living three years, one is living two years and three are living one year or less after treatment at the time of this writing. One patient died fourteen months after operation and two patients could

7. Gilbert, J. B.: Studies of the Natural History of Genito-Urinary Tumors: I. Primary Cancer of Ureter: Autopsy Study with Review of the Literature, Am. J. Surg. **36**: 711-716 (June) 1937.

8. Pack, G. T., and LeFevre, R. G.: The Age and Sex Distribution and Incidence of Neoplastic Diseases at the Memorial Hospital, New York City, with Comments on "Cancer Ages," J. Cancer Research **14**: 167-294 (June) 1930.

not be traced. One patient, who is alive two years after his operation for an extensive grade 2 lesion which measured 8 by 4 by 2 cm., associated with considerable periurethritis, was seen recently to have a large local recurrence and infiltration of the entire left wall of the bladder. The one patient who died within

Fig. 2.—Excretory urogram: a forty-five minute urogram showing pyelectasis, caliectasis and ureterectasis; the urogram is not diagnostic.

fourteen months after operation did not receive treatment which, in the light of present knowledge, would be considered adequate. The best form of therapy will be considered in the latter part of this paper. Seven patients had tumors which were graded 3 and one had a tumor graded 4. One postoperative death was caused by pyelonephritis in the remaining kidney. During the past year (1939) one tumor was explored and deemed inoperable. Of the remaining six patients operated on, two died within one year, one died within two years and one died within three years after operation. One patient is living, at the time of writing, eight years after operation. He has recently had gross hematuria, however, but has not returned to this clinic for subsequent examination. One patient could not be traced.

The smallest tumor was a little less than 1 cm. in diameter and was papillary in character. The largest tumor measured 8 by 4 by 2 cm. In five cases there was considerable periureteritis. The significant lesion found secondary to the tumor was dilatation of the ureter above the site of the lesion and in many hydronephrosis as well was present. Figure 1 is a picture of a gross specimen, showing the marked obstruction produced by the tumor of the ureter, with definite dilatation of the ureter above. Hydronephrosis in such cases can be mild or severe and can produce a palpable mass.

In more than two thirds of the reported cases in a review of the literature, the site of the ureteral tumor was in the lower third part of the ureter. In our series the lesion was in this region in thirteen of the eighteen cases. In two cases the lesion occurred at the junction of the lower and middle third portions, and in three cases the tumor was in the upper third part of the ureter.

Clinical and Pathologic Data, Results of Treatment: Eighteen Patients Suffering from Primary Epithelioma of the Ureter

		Tumor		Treatment				Results		
Case	Age, Years	Grade	Diameter, Average, Cm.	Cautery, Excision of Tumor	Nephrectomy, Partial Ureterectomy	Subsequent Complete Ureterectomy, Partial Resection of Bladder	Complete Nephro-Ureterectomy, Partial Resection of Bladder	Time of Last Follow-Up Data, Months Since Operation	Recurrent Tumors of Bladder	Survival, Months After Operation	Death, Months After Operation
1	63	1	4	..	+	+	..	38	+	38	..
2	54	2	..	+	..	+	..	116	+	116	..
3	64*	2	2	..	..	..	+	14	+	..	14
4	38	2	3	..	..	..	+	44	+	44	..
5	56	2	2	..	..	..	+	†	..	..	..
6	64	2	2.5	..	+	..	..	†	..	..	..
7	47	2	5	..	..	..	+	25	+	25	..
8	37	2	3.5	..	+	+	..	14	+	14	..
9	71	2	4.5	..	+	..	..	4	..	..	..
10	64	2	1	..	..	..	+	2	..	2	..
11	40	3	4	..	..	..	+	30	+	..	30
12	54	3	1.5	..	+	..	..	6	..	..	6
13	65*	3	1	..	+	..	..	..	..	..	P. O.
14	46	3	1	..	..	..	+	7	..	..	7
15	57	3	..	..	+	..	..	92	+	92	..
16	71	3	4	..	+	+	..	27	..	..	27
17	62	3	‡	..	..	..	..	9	..	9	..
18	57	4	2	..	..	..	+	17	..	..	17

* Female.
† Not heard from.
‡ Huge inoperable mass.

Metastases usually occur early if treatment has not been adequate, and these are found in the retroperitoneal glands, liver and lungs. The frequency with which similar lesions can be found in the bladder requires some comment. It is not our desire to discuss the theory of the multicentric origin of vesical, ureteral

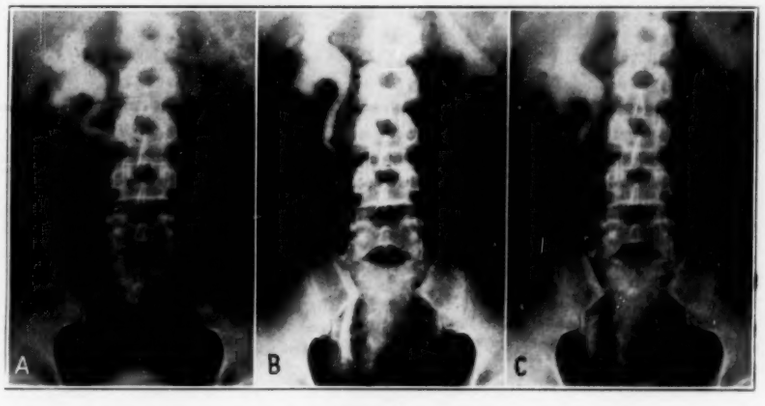

Fig. 3.—*a*, excretory urogram; a forty-five minute urogram showing (1) definite pyelectasis, (2) caliectasis and (3) ureterectasis (1 +) of the upper two-third portion of the ureter; the lower part of the ureter is not outlined; *b*, right retrograde ureteropyelogram, showing an irregular filling defect in the lower third part of the ureter, with dilatation of the ureter above; *c*, delayed urogram made twenty minutes after the retrograde catheter had been removed and the patient had been allowed to walk around; medium is still retained in the renal pelvis, calices and ureter.

and renal pelvic tumors or the theory of implantation of fragments of these neoplasms. However, we must call attention to the fact that these lesions have a tendency to recur in the bladder and each patient after operation should be instructed to return for periodic,

regular cystoscopic examination, as do patients operated on for primary vesical neoplasms.

Complicating pathologic processes are common in epithelioma of the ureter. We have already mentioned dilatation of the ureter and the renal pelvis. A not infrequent observation is secondary infection with pyonephrosis, and in a review of the literature associated

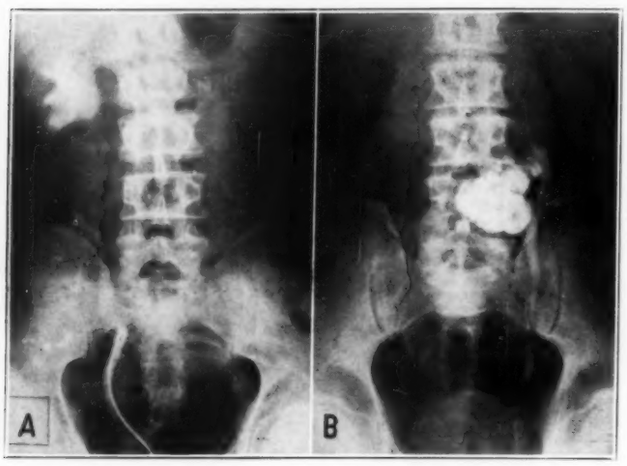

Fig. 4.—*a*, retrograde urogram of an opaque catheter in the right ureter; obstruction is at the level of the second sacral vertebra; the narrowed part of the ureter is situated just above the point of obstruction for a distance of 1 cm.; the ureter above is irregularly dilated (graded 2 to 3) and is tortuous; pyelectasis, grade 2+ and caliectasis, grade 1, are present; *b*, left retrograde ureterogram showing obstruction producing a filling defect in the ureter at the level of the third lumbar vertebra. No medium passed above the obstruction (the large, mottled, irregular shadow is a mass of calcified mesenteric glands).

calculi were found in approximately 15 per cent of cases. In three of our cases there was associated nephrolithiasis.

SYMPTOMS

Hematuria and pain are the predominant symptoms. A mass in the loin occasionally has been noticed when hydronephrosis is associated. Hematuria is usually the first symptom and may or may not be associated with pain. It occurred in sixteen of our cases and was the chief complaint in thirteen. Generally it is intermittent and begins without cause, but it may be associated with exertion or straining; the bleeding is marked and the blood is thoroughly mixed with the urine. Intense and colicky pain may be associated if there is formation of clots. These clots from the ureter usually are rather characteristic, being long and stringy and resembling a worm.

Pain of varying degrees has been noted. There may be none at all; a few patients will notice a dull, aching sensation in the loin, and a few will present a history of definite renal and ureteral colic. Pain may be the initial symptom; if it is, it shares importance with hematuria in this respect. In almost all cases it is one of the principal factors during the course of the disease.

The finding of a mass by the patient is noted in a small percentage of cases, and this mass is a hydronephrotic kidney secondary to the obstruction in the ureter produced by the primary neoplasm. Rarely, if ever, does the ureteral neoplasm itself produce a palpable tumor.

Occasionally the patient notices some frequency of urination, but the vesical symptoms usually are minimal. Backache is a rather common complaint.

DIAGNOSIS

Urinalysis, cystoscopy and urography, both excretory and retrograde, are of the utmost value in diagnosing ureteral neoplasm. The urine may contain erythrocytes, leukocytes (if infection is present), ureteral epithelium and fragments of tumor. The latter, if present, are very helpful in establishing the diagnosis of tumor but probably are found infrequently. Hematuria was noted in fifteen cases at the time of examination.

Cystoscopic examination may reveal an entirely normal bladder and normal ureteral orifices. Secondary cystitis may be seen if infection accompanies hydronephrosis. The ureteral orifice on the involved side may show evidence of an inflammatory reaction around it, manifested by a ring of edema with local redness, with or without erosion or distortion of the orifice. If the growth is situated low in the ureter, a bulging of the intramural ureter into the bladder may be noted, and in some cases the tumor mass or part of it may herniate through the ureteral orifice into the bladder. If obstruction from the growth is complete, no urine can be seen coming from the ureteral orifice on that side because the kidney may have become functionless. If the obstruction is not complete, the ureteral spurts of urine may be bloody or turbid. In one of our cases the jet of urine from the ureter was perfectly clear, but, when the catheter was passed up the ureter, bright red blood was seen to emerge from the orifice alongside the catheter. As Chevassu and Mock [9] suggested, bloody urine may be obtained from the ureter below the site of the tumor while clear or turbid urine, depending on whether or not associated infection is present, will drain from the catheter when it is passed above the tumor. This is a delicate procedure and may be valuable if it is satisfactorily carried out.

Excretory urography has been of great help in demonstrating the degree of function remaining in the kidney. If function still remains, the urogram will show whether or not secondary hydronephrosis or hydro-

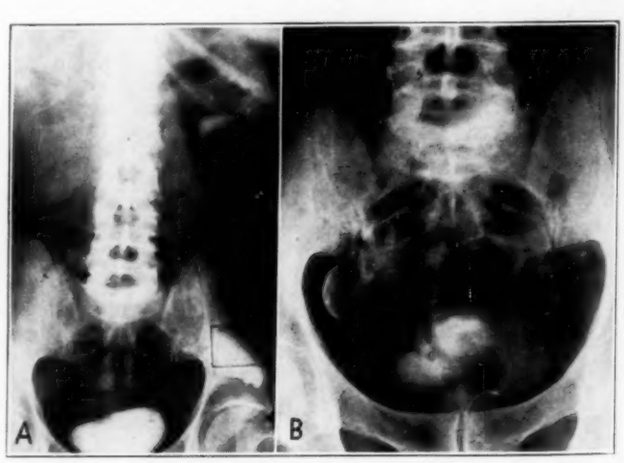

Fig. 5.—*a*, fifty minute excretory urogram showing large soft mass of tissue in the right renal region, with no evidence of renal function; *b*, right ureterogram of ureteral stump, showing huge irregular filling defect in the lower third portion of the ureter.

ureter is present. Occasionally the point of obstruction may be clearly defined, with a dilated ureter above and little or no evidence of medium in the ureter below. However, a review of our own cases and also of those in the literature reveals that the diagnostic value of the

9. Chevassu, Maurice, and Mock, Jack: Epithéliome primitif de la partie moyenne de l'uretère, Bull. et mém. Soc. d. chirurgiens de Paris **38**: 522-533 (April) 1912.

excretory urogram in epithelioma of the ureter is not in actual demonstration of the lesion by showing the filling defect or the stricture in the ureter but rather in demonstration of the degree of function present. If function is present, the amount of dilatation of the urinary tract above the lesion will be shown in this urogram (figs. 2 and 3 *a*, *b* and *c*).

Retrograde pyelo-ureterography is necessary in most instances to show the actual deformity and its situation (fig. 4 *a*). When ureteral obstruction is complete and impassable to a catheter, a retrograde ureterogram will also demonstrate the point of obstruction by outlining the ureter below this point (fig. 4 *b*). Frequently the tumor will produce a filling defect in the urogram whether the urogram is excretory or retrograde, and this defect is characterized by a marked irregularity in the outline of the ureter at the site of the lesion, with or without dilatation of the ureter above, and a normal outline of the ureter below, the tumor.

Accuracy of diagnosis has improved as a result of excretory urography and in the majority of the cases in this series the need for an exact determination of the cause of pyelectasis was evident from the excretory urograms. Nevertheless the excretory urogram is notoriously lacking in its ability to outline the ureter in its entirety. As a result of this, exact evaluation of the underlying pathologic process producing the obstruction is not always possible without the making of retrograde urograms. Undoubtedly a number of patients suffering from epithelioma of the ureter have had a wrong diagnosis of hydronephrosis; the true diagnosis has been missed until such time as the patient has again presented himself with continuation of the hematuria. Two patients were operated on for hydronephrosis and the tumor in the ureter was found subsequently. In another instance the kidney was removed for hydronephrosis (fig. 5 *a*) and the patient returned later because of persistent hematuria. Cystoscopy was done and a ureterogram made of the remaining stump of the ureter. This procedure revealed a definite filling defect and a diagnosis of ureteral neoplasm was made (fig. 5 *b*). The diagnosis was confirmed at the time of operation. Again we wish to emphasize the importance of ascertaining the cause of existing hydronephrosis, particularly of patients more than 50 years of age.

TREATMENT

Numerous surgical procedures have been suggested as the proper means of treating tumors of the ureter. When a discussion of treatment of this condition is considered it must be realized that, although many observers refer to "benign papillomas" of the ureter in much the same way as they do to "benign papillomas" of the bladder, these tumors are neither benign pathologically nor benign clinically and must be considered as being malignant lesions if the desired results are to be obtained. For this reason we believe that the early suggestions of Marion,[10] Albarran and others regarding incision of the ureter over these so-called benign papillomas and destruction of them with surgical diathermy current are not sound and should not be practiced. In an early case of our own series in which the tumor was removed in this manner there have been frequent recurrences, finally necessitating nephrectomy, ureterectomy and, more recently, resection of the bladder. This tumor was graded 2 on the basis of 4, according to Broders' classification.

It is possible, to be sure, to resect a segment of the ureter containing a small early malignant lesion and then to reestablish continuity of the ureter by end to end anastomosis, but the probability of recurrence is so great that such a conservative procedure is not justified. If it is imperative to conserve a functioning kidney on the affected side, such as would exist if solitary kidney was present or if a functionless kidney was present on the opposite side, in such circumstances the ureter should be divided well above the site of the lesion as near the renal pelvis as possible; permanent nephrostomy should be followed by complete ureterectomy and segmental resection of the ureterovesical orifice. In this connection it is of interest that three of our patients who had grade 2 lesions, and for whom segmental resection of the vesical wall containing the ureterovesical orifice and intramural portion of the ureter was not done, all suffered from recurrences in this region which required subsequent resection.

The reason for recurrence of the lesion in the bladder is a debatable question and does not come within the scope of this paper. However, it must be remembered that the lymphatic vessels of the ureter extend to the renal pelvis and the aortic glands and also anastomose freely across the base of the bladder. Also the iliac glands are directly connected to the lymphatic vessels of the lower third part of the ureter. It is reasonable to assume, on the basis of present knowledge of the growth of cancer, that in primary epithelioma of the ureter the lesion could grow by lymphatic extension and by direct extension down the ureter and directly through the walls of the ureter to contiguous structures. For example, intestinal obstruction has been reported to occur by direct extension from carcinoma of the ureter.

In view of these facts, certain surgical procedures for the management of primary epithelioma of the ureter definitely can be proposed to produce the best possible results. The operation of choice, if the lesion is operable, is total nephro-ureterectomy and segmental resection of that part of the bladder containing the ureterovesical orifice and the intramural portion of the ureter. The adipose tissue situated along the ureter should be carefully kept intact because of the likelihood that the cancer has extended to it.

The size and rate of growth of the lesion are definite factors which influence recurrence and mortality. For instance, a lesion which is large but slow in growth is wholly as formidable as a very small lesion of rapid growth, if not more so. An excellent illustration of this point is presented by our own case in which a lesion occurred in a ureter whose corresponding kidney represented complete aplasia. The lesion was slow in growth but measured 2 by 8 cm. Complete ureterectomy and segmental resection of the bladder were performed. The patient is still alive at this writing but has a massive local recurrence and his early death is inevitable. In the light of our experience to date it would appear that, if much extra-ureteral fixation is present, local recurrence can be expected and that all future efforts at eradication following complete excision should be extensive roentgen therapy directly over the original site of the tumor.

10. Marion, G.: De l'étincelage des papillomes de l'uretère, J. d'urol. 8: 129-133, 1919.

The use of applications of radium has been advised by Hess,[11] who has constructed an apparatus and devised a method of applying radium directly up the ureter to the site of the lesion. We have not had experience with this procedure, but it would seem to us that if such a procedure could be successfully carried out it might be advantageous to irradiate the lesion locally and to follow this procedure with complete nephro-ureterectomy as offering a better chance of cure of some lesions.

Our usual procedure in performing nephro-ureterectomy is to expose the primary lesion through an inguinal incision, great care being taken to prevent separation of the fatty tissue from the lesion. The ureter is carefully separated down to the bladder. Segmental resection of the wall of the bladder, including the ureterovesical orifice and all adjacent fat, is performed. This portion of the ureter and the wall of the bladder is then covered with a large Penrose drain to prevent contamination of adjacent structures. The inguinal incision is closed and the patient is then turned in the kidney position. The kidney is then removed together with the attached ureter and segment of bladder, through the usual kidney incision. A course of postoperative roentgen therapy is advised because of the tendency for local recurrence within the bladder to occur. The patients are followed for a five year period, the same as is done with patients who have tumors of the bladder. We believe that if complete nephro-ureterectomy, together with segmental resection of the bladder, is performed in all cases in which the lesion is operable a greater percentage of cures will be obtained than has been obtained by other methods.

SUMMARY AND CONCLUSIONS

Primary epithelioma of the ureter is a comparatively rare disease, but it occurs sufficiently often that the possibility of such a condition's being responsible for hydronephrosis, especially if it is associated with hematuria, must be recognized. Hematuria is the outstanding symptom and the blood in the urine is often bright red.

Excretory urograms are valuable, if the kidney is still functioning, in that they reveal the extent of the pyelectasis, caliectasis and ureterectasis present, but they may or may not identify the obstructing lesion of the ureter. Retrograde pyelograms are essential to demonstrate the lesion in most instances and should be made whenever patients with hydronephrosis are of the "cancer age," if the cause is not definitely understood.

Treatment of the condition is surgical and surgical intervention should be instituted early. Complete extirpation of the kidney, ureter and the ureterovesical segment of the bladder should be done because of the tendency for the growth to extend through the wall of the ureter to adjacent structures, and all periureteral adipose tissue should be removed with the ureter.

The results of surgical treatment parallel closely the completeness of the operation, the degree of malignancy present and the operability of the lesion. Low grade lesions, although of large size, may be as great a hazard to the life of the patient as small, high grade lesions. Roentgen therapy should be administered postoperatively to all patients.

11. Hess, Elmer: Tumors of the Upper Urinary Tract, Pennsylvania M. J. **42**: 868-872 (May) 1939.

ABSTRACT OF DISCUSSION

DR. PAUL A. FERRIER, Pasadena, Calif.: In the Section on Pathology and Physiology of the American Medical Association two years ago, Dr. Foord and I presented a review of 133 cases and added six. To date there are 170 cases, all but fifty in the past ten years. We found hematuria, pain and palpable mass the most common leads to diagnosis. Hematuria is the most striking symptom and was absent in only eleven of 139. The next most common symptom, pain, was absent in only sixteen of 139 cases. The mass was most often the occluded kidney. But one should never neglect to palpate the lower part of the ureter. X-ray examination may show an obscure mass. Coincident stone is occasionally present. Metastases in bone and lungs may be seen. In more than half the cases excretory urograms showed no dye on the affected side. In cystoscopic study of eighty-one cases the ureteral tumor was visible in thirty cases, but only during peristalsis in two. Bleeding was seen from the meatus in twenty-six, congested meatus in seven and impassable obstruction to the catheter in fifty of the eighty-one. The catheter induced bleeding in seventeen, clear urine was obtained from beyond the tumor in three and there was associated tumor of the bladder in six. A good ureterogram may be hard to get. Most frequently the obstruction is impassable. There were only fifty-four correct diagnoses. All epithelial tumors of the ureter should be considered carcinoma. Histologically ureteral tumors are identical with those of the bladder and renal pelvis, but the rich lymphatics of the ureter and thin wall make extension beyond its origin of the same degree of malignancy much more rapid. All agree that the ideal treatment is nephro-ureterectomy with a cuff of bladder. If the cancer has widely invaded extra-ureteral tissues, resection is of doubtful value. Thompson-Walker, Bachrach and Thomas each resected tumors of the lower end of the ureter and transplanted the ureter into the bladder. Papin resected a tumor of the upper part of the ureter and transplanted the ureter into the pelvis. Wohlleben resected a small tumor of the ureter and did an end to end anastomosis, followed in a year by recurrence. The danger of recurrence outweighs conservation. In suitable cases a one stage operation is desirable, but in forty-four one stage nephro-ureterectomies the mortality was 40 per cent, while in twenty-two cases done in two stages the mortality was only 5 per cent. The prognosis is bad. Drs. Counseller and Cook have one eight year cure. There are three others on record.

DR. MONROE E. GREENBERGER, New York: This type of urinary tract involvement had to await the development and refinement of urologic technic before antemortem diagnosis became possible; for this reason the vast majority of cases have been reported in recent years. The treatment is nephro-ureterectomy with segmental resection of the bladder containing the intramural portion of the ureter. This method is of greater value than resection of the tumor-bearing portion of the ureter not only because of the danger of recurrence or the possibility of multicentric foci but because the lymphatics ascend from the pelvic portion of the urinary tract along the ureter to the regional nodes near the kidney pedicle. It is therefore advisable to do a nephro-ureterectomy with removal of the periureteral and perirenal fat. A preoperative diagnosis, as shown by the authors, is not difficult when the possibility of ureteral tumor is kept in mind and a complete urologic survey is performed. The diagnosis in our case was comparatively easy, owing to the fact that blood was seen emanating from the ureteral orifice and, when the ureteral catheter was passed to the kidney pelvis, crystal clear urine was obtained. This finding, plus a "lobster claw"-like filling defect in the lower third of the ureter on retrograde pyelography, convinced us that the diagnosis was a tumor of the ureter.

DR. HUGH H. YOUNG, Baltimore: Recently I had a patient for whom complete nephro-ureterectomy was done by an excellent urologic surgeon. He divided and ligated the ureter where it entered the bladder. Only the intramural portion about 1 cm. in length remained. Nevertheless when the patient came to me there was a cauliflower-like tumor which had grown into the bladder from this remaining portion of the ureter. It looked like a strawberry and was approximately 2 cm. in diameter. It seemed desirable to do a very radical resection

of the bladder wall and adjacent tissues. I felt confident that this could not be thoroughly done from above. I opened the bladder widely, inserted my self-retaining four bladed retractor, picked up the mucous membrane with forceps at a distance of 2 cm. from the tumor in every direction and made a circular incision around these forceps. At the upper inner portion the incision went down to the peritoneum, which was seen, picked up and opened. The finger was inserted, and against it the peritoneal wound was enlarged in each direction. In the lower portion the seminal vesicle was adherent and removed with the mass. A few bleeding points were tied, and the tissues above the bladder adjacent to the old operative wound were also excised. This left an opening in the peritoneum about 2 inches long and 1 inch wide. No difficulty was experienced in closing this with continuous plain catgut. The muscle and mucosa of the bladder were then approximated with continuous catgut. The whole operation was done through the bladder and was very radical in scope. Suprapubic drainage was provided. The patient's postoperative course was satisfactory. Since his return home six months ago he has continued to do well. I offer this transvesical intraperitoneal operation for radical removal of the lower end of the ureter, when it is involved, as the most thorough method of handling such cases.

DR. VIRGIL S. COUNSELLER, Rochester, Minn.: If I were to emphasize any part of the management of such patients, I would emphasize accurate diagnosis and then advise performance of nephro-ureterectomy in one stage unless certain difficulties are encountered, in which case the procedure would be most difficult. Also I feel that the low inguinal incision for the removal of the lower portion of the ureter and the segment of bladder should be ample. An ample incision will heal just as well as a small incision and, furthermore, it will facilitate the operation tremendously. I am delighted that Dr. Young brought out the fact that when a tumor of the type we are discussing does recur in the ureteral orifice, that is, a tumor which was not removed by segmental resection, the surgeon is faced with a very difficult problem. Moreover, no matter how radical the operation might be for secondary removal of such a tumor, the chances of cure are rather negligible.

MORSUS HUMANUS

SIXTY CASES OF HUMAN BITES IN NEGROES

FRANK K. BOLAND, M.D.
ATLANTA, GA.

Trauma caused by human teeth (morsus humanus) may occur in two ways. The assailant may be the victim when his knuckles come in violent contact with the teeth of the person receiving the blow, or the victim may be the one who is actually bitten by another individual. The two methods of injury are responsible for about the same number of reported cases. Strictly speaking, trauma to the clenched fist is not an actual bite, but it is a more civilized manner of producing the lesion. Deliberately burying one's teeth into human flesh is reminiscent of primeval savage instincts, if not cannibalism, and impels us to camouflage "human bite" with the milder Latin "morsus humanus."

The remarkable feature of morsus humanus is the virulent, destructive trauma which so often follows an apparently trivial wound. Mason and Koch,[1] in their exhaustive paper, mention three factors which cause the excessive, and sometimes permanent, damage or death. These factors are, first, the virulence of the pathogenic organisms; second, the method whereby infection is conveyed along tendons and tendon sheaths, and, third, the complicated arrangement of joint capsules and facial planes which are difficult to free from infectious processes. The role played by these agencies is well illustrated in the series to be reported. As a matter of fact, while the cases considered here show bites of the face, ear and arm, 36 in number, the only injuries which

Fig. 1.—Osteomyelitis of forefinger from morsus humanus.

resulted seriously were those of the fingers and hand, 24 in number.

Various bacteria found in the mouth were recovered from wounds inflicted by teeth. Such bacteria were staphylococci, streptococci, colon bacilli, the fusiform bacilli and spirochetes of Vincent, and others. The symbiotic action of the two last mentioned make them especially dangerous. There is an interesting analogy between the effects produced by these organisms and the effects of gas-forming bacteria. Both are anaerobic at this time, both act only on devitalized tissue and both give forth a malodorous, characteristic odor. Hennessy and Fletcher[2] found that the organisms of Vincent do not multiply when inoculated under healthy skin but only after the skin has been injured.

In regard to the two other factors described by Mason and Koch, when the clenched fist strikes the teeth and gums, at the moment of impact the tendon sheaths, tendons and other tissues of the extensor area of the fingers are stretched to full length. The skin over the knuckle is penetrated, and the tendons and possibly the joint are exposed. As the fingers are then straightened the damaged parts relax, and extension carries infection deep into the tissues. Three spaces soon become involved, the joint space, the dorsal subcutaneous space and the dorsal subtendinous space between the tendon and the capsule. Thus the growth of anaerobic germs is accelerated.

Fig. 2.—Morsus humanus of thumb, which led to amputation.

REPORT OF CASES

The present paper was prompted by the observation of 60 cases of morsus humanus among the patients of the Negro division of the Grady Hospital (Emory University) during the past year. Such cases among the white patients were rare.

From the Department of Surgery, Emory University School of Medicine.

Read before the Section on Surgery, General and Abdominal, at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

1. Mason, Michael L., and Koch, Sumner L.: Surg., Gynec. & Obst. **51**: 591-625 (Nov.) 1930.

2. Hennessy, P. H., and Fletcher, William: Lancet **2**: 127-128 (July 17) 1920.

While the records of the early periods of the institution are incomplete, the impression exists that infected wounds from human bites among Negroes are more virulent today than formerly. The reason is believed partly to be the fact that the teeth and gums of the

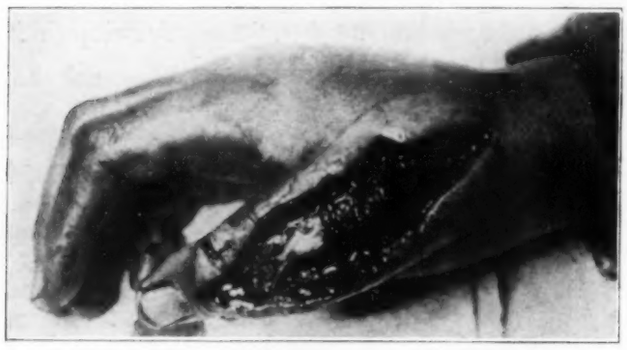

Fig. 3.—Débridement which saved thumb.

Negro, who now eats more so-called civilized foods, harbor more disease than during the days when he subsisted on rougher, cleansing articles of diet such as cabbage and turnip greens. It is difficult to locate a "biter." Only three in this group were found and examined. Two of these had bitten into finger joints, and one had bitten a woman on the cheek and arm. In one of the first cases cultures and smears showed the fusiform bacilli and spirochetes of Vincent, staphylococci and streptococci; the second case showed only the later two organisms. Both bites in these instances caused serious damage to the fingers, and the same kind of bacteria, plus others, were recovered from the wounds that were discovered in the teeth and gums of the "biters." The teeth of the third "biter" also showed the two forms of Vincent's organisms, but the wounds on the cheek and arm of the victim healed with but little infection.

Women furnish the larger number of patients with morsus humanus, and in this series 43 patients were female and 17 were male. The anatomic distribution was as follows: face, 24 cases; fingers, 24; hand, 3; ear, 2; arm, 7. As already mentioned, wounds of parts other than those of the fingers and hand produced only

Fig. 4.—Morsus humanus of lower lip two hours after infliction of wound.

symptoms such as would follow an ordinary abrasion or laceration, although it is conceivable that virulent infection might follow bites in any portion of the body. The worst results followed trauma made with the clenched fist or bites which opened joints and tendon sheaths. The patients were first seen in the clinic from a few hours to eight days after receiving the injury and had been given various forms of treatament or no treatment. If the wound was recent, no evidence of inflammation or suppuration was present; if one or more days had elapsed since injury was inflicted, redness, swelling, localized heat and tenderness existed. Lymphangitis and metastatic adenitis may have developed. Stiffness of fingers caused by pain or swelling was a common symptom. In some cases a seropurulent, foul-smelling discharge produced the characteristic disagreeable odor. On roentgen examination, six patients later showed osteomyelitis of the phalanges. There might be septicemia, with high fever. A prolonged course resulted in ill patients requiring hospitalization. Although 40 per cent of the patients admitted to this hospital give positive Wassermann or Kahn reactions, it could not be determined that syphilis was transmitted in any of these cases of human bite.

END RESULTS

One patient lost the last phalanx of a finger, two patients had whole fingers amputated, and another lost her thumb and forefinger. Several patients returned to

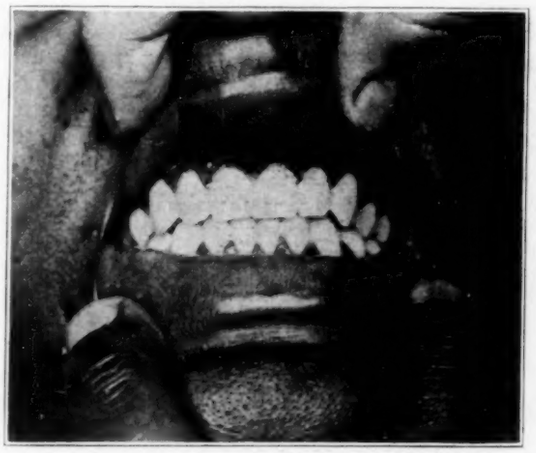

Fig. 5.—Blue-gummed Negro patient with normal flora of teeth and gums.

the clinic with deformity or ankylosis. There was one death:

A Negro woman aged 38 received a human bite of the terminal phalanx of the left forefinger eight days before admission to the hospital. The finger became swollen and tender the next day, and the disease had spread until the whole hand was involved. She had treated the lesion with hot epsom salt dressings but did not consult a physician before entering the hospital. The patient had slight exophthalmos and moderate enlargement of the thyroid gland. The blood pressure was 120 systolic and 80 diastolic. The basal metabolism was not taken. The temperature was 102 F., the pulse rate 120 and the respiratory rate 30. The leukocytes numbered 31,600. Operation under nitrous oxide-oxygen was done the day after admission, through several multiple incisions extending into the palmar surface of the hand, 20 cc. of thick pus being evacuated. Through and through drainage was established. The next day incisions were made on the radial and ulnar sides of the forearm and connected by blunt dissection. The cuts in the hand were opened wider. Carrel-Dakin tubes and treatment were instituted. The patient's condition continued to grow worse and four days later all incisions were again enlarged and thick necrotic material was removed. The index finger was entirely gangrenous and was amputated. The patient was given two blood transfusions. About one month after injury she began coughing and expectorated foul smelling sputum suggesting lung abscess, which was confirmed by roentgen

examination. The sputum was negative for tubercle bacilli. The patient grew progressively worse and died two months after injury.

TREATMENT

No standard treatment has been established because none has given uniformly good results. On account of the bad reputation of morsus humanus of the fingers and hands, the moment it is known that the wound was made by human teeth radical treatment is begun. There is never any effort on the part of the patient to hide the cause of the injury. On the contrary, he wishes to tell all about it. If the wound has been sutured it is opened and swabbed with phenol or packed with sulfanilamide crystals. At the same time sulfanilamide is prescribed by mouth. If the patient is hospitalized the Carrel-Dakin technic usually is carried out. Old wounds are debrided, which procedure I believe is better than the use of nitric acid, the actual cautery or roentgen rays. I have had no experience with arsphenamine or the zinc peroxide applications of Melaney.

THE BLUE-GUMMED NEGRO

For many generations a superstition has existed in the South that the bite of a "blue-gummed" Negro is poisonous and necessarily fatal. Such an idea is so firmly fixed in the minds of certain classes of the Negro population that they exonerate the killing of a blue-gummed Negro by the victim of the bite. It is considered justifiable homicide.[3] The danger from this injury has no scientific basis, but an effort was made in this study to examine the gums of such persons for evidences of "poison." Blue gums were found to be very common and were more marked in full blooded individuals than in mulattoes. The discoloration, known as melanoplakia, usually is confined to the gums of the incisor and canine regions. No reason is assigned for the existence of the anomaly except that of a racial characteristic. Among 32 patients examined by Dr. H. J. Harpole in the Negro clinic of the Atlanta-Southern Dental College, differentiation was made between congenital blue gums and blueness due to lead and bismuth poisoning. According to Dr. Harpole, in this day of the bismuth treatment of syphilis, bismuth poisoning has become extremely common, and he has recorded 200 cases in his clinic during twelve months. Recognition of the conditions is easy inasmuch as blue gums caused by lead or bismuth poisoning are swollen, red, tender and bleeding and give forth a fetid odor, whereas normal blue gums present none of these symptoms. In discoloration due to bismuth the blueness is shown as a thin line close to the teeth, and the tongue is very sore.

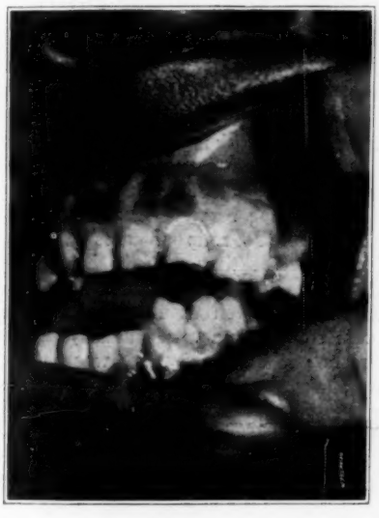

Fig. 6.—Blue-gummed Negro patient with fractured mandible. Innocuous bacteria recovered from gums.

3. It is said that the reason for the fear of the bite by a blue-gummed Negro is the idea that blue gums are caused by the administration of mercury given in the treatment of syphilis.

On the other hand, the mouth of the typical blue-gummed Negro usually is otherwise negative or presents only the oral flora found around most teeth and gums. In 20 patients with blue gums from whom cultures and smears were taken only the usual innocuous bacteria were recovered, and as a matter of fact the teeth and gums of these persons appeared cleaner and more normal than the teeth and gums of Negroes without blue gums. Smears from the other 12 patients revealed Vincent's organisms, but the Negroes appeared to possess average teeth. From this study, therefore, it is fair to affirm that the bite of a blue-gummed Negro is no more dangerous than the bite of a member of the race whose gums are not blue. The appearance of the two kinds of gums under the microscope is identical. The impression has prevailed that Negroes are blessed with unusually good teeth, but dental authorities state that this is another exploded tradition. Their teeth look white in comparison with their black skin.

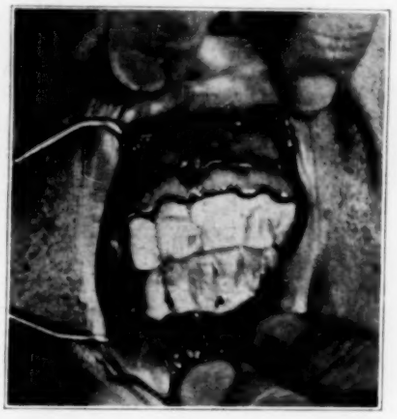

Fig. 7.—Thin blue line on gum, indicating physiologic or poisonous action of bismuth.

HOW CLEAN IS A HOUND'S TOOTH?

Consultations with Dr. C. C. Rife and other veterinarians show that as long as the hound is allowed to eat his usual rough food, including plenty of bones, his teeth and gums remain free from infection and necrosis but that when coddling begins and the dog is fed soft foods his teeth decay like those of human beings. It has been a noteworthy observation that the wound made by the bite of a dog rarely becomes infected although the dog may have rabies and may transmit it to its victim. Perhaps if the dog bite exposed a dorsal knuckle, serious infection would ensue as in a human bite. A dog bit a veterinarian's nose, leaving a gaping wound. The wound was swabbed with a mild antiseptic and sutured tightly, no infection resulting. The dog was killed and found to have rabies. Inspection of a dog's mouth shows how normal food maintains cleanliness. The teeth are widely spaced, and rough articles of diet

Fig. 8.—Dog fed on soft food, with pyorrhea and loss of most teeth. Vincent's bacteria present.

prevent the accumulation of injurious substances. Smears made from dogs with apparently clean mouths demonstrated about the same organisms generally found in normal human mouths, staphylococci, streptococci and sometimes Vincent's bacteria.

CONCLUSIONS

The principal conclusion to be drawn from a consideration of morsus humanus is to pay tribute to Mason and Koch for their historical contributions to the subject. Without the knowledge which their experiments and clinical experience have furnished, the course of events following this trauma to the clenched fist would still be but little understood. Their description of the three factors involved in the destructive and dangerous lesions which result from apparently mild trauma is a matter of the greatest importance. The pathologic processes taking place in tendon sheaths, joints and fascial planes make such injuries from human teeth an entity. Human bites of other parts of the body, exclusive of the hand, present no problems different from abrasions and lacerations from other causes. Praise for the authors of this paper, published ten years ago, should include the founder of their School of Surgery of the Hand, the late lamented Allen B. Kanavel, a

Fig. 9.—Hound with clean teeth and gums. No pathologic bacteria present. Note wide spacing of teeth.

former chairman of this section. The enormous value which the work of these men ascribe to the human hand creates of this collection of anatomic tissues one of the paramount organs of the body, rivaling in usefulness, especially to the surgeon, any other organ or system. Such an aid to our art and science as the hand is worthy of the most meticulous care. In the present instance the matter appears to deal with the care of the teeth and the prevention of morsus humanus. The fellow who formerly carried brass knucks was wiser than he knew.

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ABSTRACT OF DISCUSSION

DR. MICHAEL L. MASON, Chicago: A discussion of human bite injuries with men interested in the hand clinics in many of the large charity hospitals reveals that such wounds are by no means infrequent. Koch and Allen at the Cook County Hospital see approximately 75 cases a year. Of all bites, that of the human animal is the worst. The bite of the cat, the camel and the monkey rank next to the human bite in seriousness. The term human bite is somewhat of a misnomer since a great many of the bites are tooth wounds received on the knuckles during a fist fight. Important factors in the infection are the extent and depth of the wound, the crushing and devitalization of the tissues, and the types of the micro-organisms introduced. Deep penetrating wounds in which the fascial planes, joints and tendon sheaths are invaded invariably give rise to most serious processes unless they can be seen early and cleansed and debrided extensively and thoroughly. The human mouth harbors a multitude of pathogenic and nonpathogenic bacteria already acclimated to growth in human tissues and fluids. They may proliferate and become invasive almost as soon as they are deposited and are already thriving before the body can muster forces against them. The evidence also seems conclusive that many of the organisms thrive well in symbiosis and that this is an important factor in the infection. Wounds of the trunk, breast, face and genitalia are relatively benign in comparison to those of the hands and fingers, a fact probably associated with the circulation of the area involved. It has seemed to me that we are dealing with a nonspecific infection and that several clinical pictures are produced. The bacteriology of infections from mouth bites is becoming better understood. For many years the process was looked on as a Plaut-Vincent infection. Careful studies with anaerobic as well as aerobic methods have shown that anaerobic and microaerophilic streptococci play an important role. It seems likely that infections from mouth bites owe their severity and characteristic manifestations to symbiosis of streptococci of this type with other bacteria from the mouth. On this phase of the problem we must look to Dr. Meleney for enlightenment. As to treatment, we must differentiate between the case seen early and that seen after infection has become well established. In the early case my own preference is for careful and thorough cleansing with soap and water, excision of crushed tissues and leaving the wound open. Bed rest, splinting and a warm moist pack will then give the patient the best chance of escaping a severe infection. In the late case, adequate drainage and the use of zinc peroxide by the technic of Meleney have yielded the best results of any treatment so far used.

DR. FRANK L. MELENEY, New York: In all these cases mouth bacteria are deeply introduced into the tissues, and retracting muscles or tendons have withdrawn them into the depths of the wound, where anaerobic bacteria have a predilection for growing. There is another group of cases in which these organisms are indirectly rather than directly introduced. A case has been reported which started from a blister pricked with a knife blade which had just been used for picking the teeth, and I have seen a case caused by a man suddenly thrusting his hand into his trousers pocket where there was a loose toothpick which he had used sometime before. That hand bites are more disastrous than those in other parts of the body is partly due to the fact that injured fascia, ligament, tendon and bone offer a particularly favorable environment for the organisms. These are the nonhemolytic anaerobic streptococci, the fusiform bacilli and spirochetes. They are not only anaerobic but have a definite synergistic action, making the combination of these organisms much more virulent than the pure cultures of the same organisms. The fusiform bacilli and spirochetes are so closely bound together that Tunnicliff could not be sure that they were not phases of the same organism. Knorr reported that he had never seen fusiform bacilli or spirochetes without anaerobic streptococci, and this has been my experience. This clearly indicates the importance of anaerobic bacteriology in any study of these cases. I have yet to see a report of a large series of these cases in which adequate anaerobic bacteriologic studies had been done. In the hospital with which I am associated these cases have been relatively few and we have not reported a complete series. The anaerobic bacteria and the damage which they can do if left in the wound must be constantly kept in mind. Removal consists of complete débridement as soon as the patient comes to the surgeon, no matter at what period of time after the injury. After débridement the wound should be flooded with a creamy suspension of active medicinal zinc peroxide in distilled water, covered with a layer of cotton soaked in the same material, then a layer of cotton wet with water, and then sealed with several layers of petrolatum gauze or sheet rubber to prevent evaporation. We have used it routinely and it has been frequently suggested in reports since then. Maier at Bellevue Hospital reported a series of human bites and obtained good results with zinc peroxide, but his supply gave out and he treated his subsequent cases with arsphenamine, with less success.

DR. CLAUDE E. WELCH, Boston: Several years ago in the Massachusetts General Hospital we encountered a series of rather severe tooth lacerations of the finger. Prompted by the number of stiff and amputated fingers that resulted, we made a study and laid down principles of treatment to be followed. There is no doubt about the wisdom of very early and adequate drainage. The only contraindication to immediate drainage is spreading lymphangitis. If this is present, the patient must be given hot packs for a short time and then operation performed as soon as it has subsided. Provided operation is undertaken, as Dr. Mason has pointed out, there is a great deal of variation in technic, depending on whether the patient arrives for treatment early or late. We have had a good deal of success in early cases with Bates's method of excision with the electrocautery, but in late cases the anatomic details of the fingers makes wide excision extremely difficult. The principle of operation is careful exploration under a tourniquet, so that all anatomic details will be observed. It is essential that any laceration of the joint capsule, pin point though it may be, must be detected at this time if a successful result is to be obtained. An immediate smear and culture is taken at the same time. If the capsule is opened, two collar incisions in the adjacent web spaces should be made to provide adequate drainage. I believe that lacerations of the tendon and infections of the subcutaneous spaces can be dealt with adequately but that joint infections undiscovered for several days will lead to stiff joints and amputations. I have found that zinc peroxide has been of value, but it must be remembered that zinc peroxide and also some of the newer drugs are to be regarded as only adjuvants to radical surgical therapy rather than alternatives. These cases are not common. The metacarpophalangeal joint was involved in 18 cases in our series. Four fingers were amputated before this study was started. Since that time none have been lost.

Clinical Notes, Suggestions and New Instruments

CHEILITIS FROM SENSITIVITY TO OIL OF CINNAMON PRESENT IN BUBBLE GUM

JEROME MILLER, M.D., PHILADELPHIA

This case is being presented because of its unusual predilection and interesting etiology. It is a case of contact-type hypersensitivity involving the mucous membrane of the lips and is due not to direct contact with the agent per se but with the vapors of the oil.

P. I., a woman aged 25, was referred to me because of a cheilitis of six months' duration. At the time there was thought to be some relationship between the patient's fur coat and her symptoms, a fact which subsequently proved to be erroneous.

The eruption when first seen presented a swelling and mild erythema about the lips. The lips themselves were swollen, rough, fissured and scaly, and the patient complained of an itching and burning sensation. Closest scrutiny did not reveal the presence of vesicles. The lesions did not occur elsewhere on the body. She had been treated previously with various local topical applications, which did not seem to improve her condition. The personal and family histories were negative for any atopic manifestations.

The patient has been associated with a chewing gum firm in an executive capacity for the past two years. During this time she had as part of her duties the daily inspection of the factory. During her first year at the plant the flavoring agent that was used in the manufacture of the gum was bought in a prepared state. In September 1938 the firm decided to manufacture its own flavoring agent. Late in November 1938 the patient began to spend about 75 per cent of her time in the factory, working at various formulas that might be used in the flavoring of the gum. This did not necessitate her coming in contact with the ingredients used. A formula was finally arrived at and about five weeks later, in December 1938, she first noticed an eruption of the lips.

The patient was then studied and routine intradermal tests to the various foods, inhalants, pollens and environmental allergens all proved to be uniformly negative, with the exception of an unexplained marked cutaneous reaction to silk. When a retest was made to silk at a later date the marked cutaneous reaction was still present.

Patch tests were then performed with the patient's personal objects. Negative tests were obtained to her fur coat, lipstick, pomade, powder, tobacco and tobacco paper. Since the reason for the positive reaction to silk on intradermal testing was not understood, patch tests were done with green, black and pink silk. All patch tests were negative. Negative patch tests were also obtained to 2 per cent paraphenylenediamine and 5 per cent methyl orange.

The next patch tests were performed on possible environmental and occupational allergens. Samples were obtained of all the individual ingredients that entered into the manufacture of the gum. Patch tests to cane sugar, corn sugar, corn starch, dried milk solids, ethyl butyrate, extract of vanillin, precipitated chalk, base, cumar resin and erythrosin paste were all negative.

The flavoring agents used in the chewing gum were next tested and a marked patch reaction was obtained to the composite flavor. Being fortunate enough to be able to obtain the individual constituents of the flavoring compound and their percentages, a breakdown of the flavoring agent was possible. The individual flavors were tested and a marked patch reaction was obtained to oil of orange and oil of cinnamon (oil of cassia) in concentrated solutions. All the other flavors in concentrated form failed to produce a positive reaction. Subsequently the oil of orange proved to be a primary irritant. The 1 per cent oil of cinnamon produced a slightly positive reaction, whereas the 2 per cent solution produced a definitely marked reaction within twenty hours. The vehicle used to dilute the oils in all cases was alcohol. Eight normal controls were patch tested with the 2 per cent oil of cinnamon and in all negative reactions were obtained.

Fig. 1.—*A*, reaction to fume test with 1 per cent oil of cinnamon and *B*, to fume test with 2 per cent oil of cinnamon.

The problem then resolved itself into explaining how the symptoms could have developed without having the patient actually come into direct contact with the offending substance, and how this fact could be proved. The supposition was then entertained that the hypersensitivity must have occurred from contact with the vapors that were given off by the volatile oil. Proof of this was furnished by using a modification of the pill box method described by Baker, which for want of a better term I have named the fume test. Using this method I again tested the patient with the 1 per cent oil of cinnamon and obtained a markedly positive reaction within seven hours (fig. 1), characterized by a vesiculobullous eruption with a surrounding erythema. During the time the fume test was in contact with the patient's skin she complained of a tingling and itching sensation of the lips, but without any visible lesions.

From the Clinic of Allergy and Immunology of Temple University.
Read before the Annual Meeting of the Society for the Study of Asthma and Allied Conditions, Atlantic City, N. J., May 4, 1940.

In performing the fume test, the supposedly offending substance must be a volatile agent. The lid of a small metal ointment box which has been previously perforated a number of times is placed on the bottom of a larger metal ointment box. A small piece of absorbent cotton is then moistened with the substance to be tested and placed underneath the perforated lid, which is held on the bottom of the larger box by means of adhesive tape. By using this procedure it will be seen that, when the box is inverted so as to come into contact with the skin, the smaller perforated box will hang suspended and not touch the skin. Sufficient care must be taken that contact is air tight and that there is no leakage which might allow the fumes to escape and thereby give the impression of a negative reaction. If care is also taken that the cotton is not saturated, any reaction that may ensue will be the result of the fumes which escape through the perforations to reach the hypersensitive skin, to produce a positive reaction (fig. 2).

Has desensitization been resorted to and has the patient's eruption improved? The patient agreed with me that, since the vacation period was at hand, improvement would occur if she would avoid the causative factor. This is precisely what has occurred. With the return of the fall season, however, the lips continued to remain in their improved state. This is so because the patient has given up entirely her daily inspection trips through the factory and has made only two uneventful hurried trips into the factory itself since last July—the time when her lips healed completely. Another important factor in her improvement is that, whereas formerly all gums that were manufactured contained oil of cinnamon, now about 25 per cent of the entire production is oil of cinnamon—a reduction of 75 per cent with the offending specific substance. For these reasons there was no need to resort to specific desensitization.

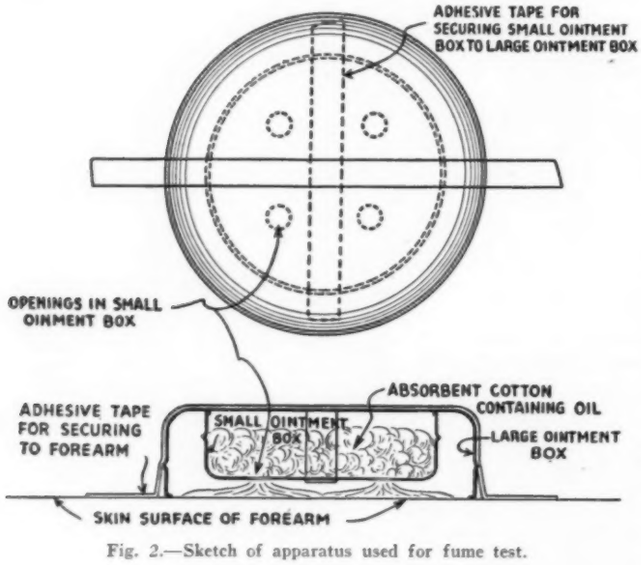
ADHESIVE TAPE FOR SECURING SMALL OINTMENT BOX TO LARGE OINTMENT BOX
OPENINGS IN SMALL OINMENT BOX
ABSORBENT COTTON CONTAINING OIL
ADHESIVE TAPE FOR SECURING TO FOREARM
SMALL OINTMENT BOX
LARGE OINTMENT BOX
SKIN SURFACE OF FOREARM

Fig. 2.—Sketch of apparatus used for fume test.

Oil of cinnamon is the volatile oil distilled with steam from the leaves and twigs of Cinnamomum cassia (Linné) Blume (family Lauraceae), rectified by distillation. It has as its chief constituent not less than 80 per cent by volume of cinnamic aldehyde. It is a yellowish or brownish liquid and has the characteristic odor of cinnamon. It is soluble in an equal volume of absolute alcohol.

There are two oils of cinnamon in commerce: one procured from the Ceylon cinnamon, the other from the Chinese cinnamon. The latter (oil of cinnamon) is now the only official one.

Oil of cinnamon is used as a flavoring agent to promote the palatability of various pharmaceutic preparations. It is used to render food more palatable and also as a food preservative by preventing the growth of molds. It is used as a carminative and to stimulate the appetite. It is incorporated in candies, chewing gum, tooth powder and cosmetics. It is also used in insecticides, mouth washes and antiseptic nasal oil sprays. It is incorporated in the official preparations of Elixir Vanillini Compositum, N. F., Nebula Mentholis Composita, N. F., Spiritus Cardamomi Compositus, N. F., and Fluidextractum Cascarae Sagradae Aromaticum.

CONCLUSION

In the first case to be reported of cheilitis due to hypersensitivity to the vapors of the oil of cinnamon present in bubble gum, the eruption was limited solely to the lips. Hypersensitivity was demonstrated by the patch test and by the fume test. Complete amelioration of symptoms followed avoidance of the oil of cinnamon.

1920 Pine Street.

Special Article

GLANDULAR PHYSIOLOGY AND THERAPY

THE ANTIHORMONES

DAVID L. THOMSON, PH.D.
JAMES B. COLLIP, M.D.
AND
HANS SELYE, M.D.
MONTREAL, CANADA

This special article is published under the auspices of the Council on Pharmacy and Chemistry. It is one of a series which will be published in book form as the second edition of "Glandular Physiology and Therapy." The opinions expressed in this article are those of the authors and do not necessarily represent the views of the Council.—ED.

At the present time the term "antihormones" is most commonly applied to certain substances of unknown origin which appear in the serum of animals treated for long periods with certain anterior pituitary extracts, which apparently explain the observed gradual loss of responsiveness to such extracts and which are capable of making other animals, previously untreated, refractory to treatment with similar extracts. The demonstration of an antihormone of this type thus involves at least three groups of animals: first, those from which the original anterior pituitary extract is prepared; second, those to which this extract is administered until they become refractory to it and the antihormone is present in their serum; third, those to which the serum is administered and which then show partial or complete inhibition of their usual response to an anterior pituitary extract identical with or similar to that used in the first place. Extracts from endocrine organs other than the anterior lobe of the pituitary may also be found to decrease in efficacy when administered over long periods, and in one or two instances the serum of the treated animals may acquire inhibitory properties and be said to contain an antihormone. Various modifications of this term have been used in other senses as well. The subject has been reviewed several times within the last few years.[1]

THE ANTITHYROTROPIC SUBSTANCE

When animals of various species are treated for long periods with anterior pituitary extracts containing the thyrotropic factor, the induced morphologic and physiologic signs of hyperthyroidism gradually wane and may indeed be replaced by signs of moderate hypothyroid-

From the Department of Biochemistry, McGill University.

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ism.[2] (In the English sparrow, however, no such refractory state has been observed.[3]) If the treatment is stopped, the animals may gradually regain their original sensitivity in from four to six months.[4]

Collip and Anderson[5] showed that the refractory state was not due to exhaustion of the thyroid under overstimulation, since thyroid tissue transplanted from a normal into a refractory animal was itself refractory; and they showed that injections of the serum of the resistant rats into untreated hypophysectomized rats prevented the normal response (increased metabolic rate) of the latter to treatment with the thyrotropic extract. They obtained similar antithyrotropic serums by treatment of guinea pigs, dogs, rabbits and horses. Long before this, Masay,[6] in a neglected paper, described cachexia in animals treated with the serum of rabbits or guinea pigs which had been pretreated with pituitary suspensions, comparing the condition with that following thyroidectomy and stating that it was accompanied by exophthalmos.

Collip and Anderson pointed out that their antithyrotropic substance had no power to inhibit the thyroid hormone, although it appeared to influence the metabolic rate rather than the structure of the thyroid in their animals. But pretreatment with antithyrotropic serum was later found to prevent the histologic signs of thyroid activation[7] and the increase in thyroid weight[8] normally observed in young guinea pigs (or chicks[9]) treated with thyrotropic pituitary extract. Such tests are probably preferable to those based on metabolic rate, which may be influenced by the specific metabolic principle of the pituitary,[10] to which no resistance is developed. During continued treatment with thyrotropic pituitary extract the metabolic rate of the rat passes through a maximum about the end of the first week and by the fifth week has fallen to levels as low as those seen in hypophysectomized animals;[5] the antithyrotropic activity of serum has been found maximal at the fifth week in sheep[11] and at the tenth week in rabbits;[12] thereafter it declines. At the peak 2 cc. of the rabbit serum will inactivate a dose of thyrotropic pituitary extract otherwise sufficient to double the thyroid weight of immature guinea pigs.[12]

The antithyrotropic substance seems to show marked but not absolute species specificity; rabbits and guinea pigs which had become refractory to bovine thyrotropic extract still responded to similar extracts from anterior lobes of pig pituitaries, and vice versa;[13] and the antiserum obtained from rabbits treated with a bovine extract did not prevent the response of guinea pigs to a thyrotropic fraction from anterior lobes of human pituitaries.[14] It is also stated that purified thyrotropic fractions prepared by flavianic acid precipitation may be administered for long periods without development of a refractory state, and are effective in guinea pigs that have become refractory to cruder fractions prepared by salting out.[15] All these observations have naturally been regarded as evidence that the antithyrotropic substance is a true antibody, produced as a response to the foreign protein present in the thyrotropic extracts. Not easily reconciled with this view are the observations that an antithyrotropic serum, administered by itself, will depress the metabolic rate of the rat[5] or the rabbit[16] and flatten thyroid epithelium in the guinea pig (Eitel and Loeser[7a]). Still more serious is the objection that antithyrotropic substance has been detected in the serum of normal, untreated animals of various species, including the dog,[17] sheep (Eitel and Loeser[7a]), rabbit[18] and man,[19] which seems to prove it to be a normal constituent of the body, unless this is not the same substance as the one found in larger amounts in treated animals. Antithyrotropic activity has been recognized in the serum of animals treated with an anterior pituitary extract which had little or no thyrotropic potency.[20] The nature of the antithyrotropic substance is perhaps less important than the fact that this substance must be expected to appear in the serum of patients treated with thyrotropic anterior pituitary extracts for long periods.[21]

The antithyrotropic substance is destroyed by boiling[5] and is apparently associated with the pseudoglobulin of the serum;[8] it may be purified by adsorp-

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tion.[22] Collip and Anderson,[19a] Loeser [17] and Gessler [23] all agree that it can be formed by hypophysectomized animals. It has been suggested that it cannot be formed by thyroidectomized animals (and even that it is identical with thyroxine [11]), but this has been denied.[24] Estrogens [25] may have some antithyrotropic activity, but this can hardly be relevant.

THE ANTIGONADOTROPIC SUBSTANCE

When chorionic gonadotropin (from human pregnancy urine or placenta) is administered for long periods to female rats, the weights of the ovaries increase at first but later decline to or below the normal level, as a refractory phase is entered;[25] a similar effect is observed when the ovaries are chronically stimulated by daily implantation of rat pituitary tissue.[26] In the refractory state the ovaries may be markedly atrophic and "wheel cells" may appear in the theca (a finding characteristic of complete absence of hypophysial stimuli), while typical "signet ring" castration cells appear in the anterior lobe of the pituitary.[27] The refractory ovaries are not exhausted and incapable of responding to any stimulus, for those which have become refractory to the influence of chorionic preparations still respond to hypophysial preparations [28] and vice versa.[26] The serum of animals with such refractory ovaries will prevent the usual response of immature female rats to appropriate gonadotropic stimulation.[29] Analogous phenomena are observed in male rats and in other species.

The question whether the antigonadotropic substance is an immune body, produced in response to the injection of foreign protein, or is to be regarded in some other light—for example, as a normal constituent of the organism—has been eagerly debated, and much of the discussion has centered on the problem of specificity, which in this case is exceedingly complex. One has to consider (1) species specificity, the comparison of extracts from the hypophyses (or other organs) of different species; (2) extract specificity, the comparison of extracts made from the same material by different procedures; (3) hormone specificity, the comparison of extracts having different ratios of follicle-stimulating and luteinizing (interstitial cell–stimulating) activity, and (4) organ specificity—for example, the comparison of preparations from human pregnancy blood or serum with extracts from human hypophysis or menopausal urine (which has been little studied), or of preparations from the serum of pregnant mares with extracts from equine hypophysis.

Female rats which have become refractory to chorionic gonadotropin still respond to implants or extracts of animal hypophyses [28] or pregnant mare serum but not, it is claimed, to extracts from human hypophysis.[30] The serum of such rats is said to protect test animals against gonadotropic stimulation, not only that with chorionic gonadotropin but that with human hypophysial extracts [31] and even that with bovine hypophysial extracts;[32] it is more usually found, however, that preparations from animal pituitaries or pregnant mare serum are not inhibited.[33] Rowlands,[34] who carried out careful and extensive cross tests, concluded that human chorionic gonadotropin displayed species specificity but not organ specificity. It has been claimed that the serums of animals refractory to the gonadotropin of pregnant mare serum will confer resistance against gonadotropic preparations from the hypophyses of horses,[35] sheep or pigs [36] or from human pregnancy urine,[37] but this has been denied,[38] and Rowlands [34] concluded that both organ specificity and species specificity are displayed, only mare's serum being inhibited. Serums obtained by treatment with hypophysial extracts show little specificity;[34] they confer protection against extracts from other species [39] or pregnant mare serum,[40] though they may have little action against human chorionic gonadotropin.[41] Under some circumstances [42] it seems possible to obtain serums which inhibit the luteinizing rather than the follicle-stimulating hormone.[43]

Further evidence of a lack of specificity hard to reconcile with an immunologic interpretation may be found in observations that antigonadotropic serums not merely inhibit injected gonadotropic preparations but

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when administered alone prevent the action of the endogenous gonadotropic hormones and have effects comparable to those of hypophysectomy. Thus the antiserums may cause ovarian atrophy and suppress estrus in the female rat,[44] prevent ovulation following mating in the rabbit,[39] interrupt pregnancy in the rabbit [45] and dog [46] and produce gonadal atrophy in male rats.[45] It will be noted also that antihormones have been produced by injection of sheep pituitary extract into sheep [40] or implantation of rat pituitaries into rats [26] (though difficulty has been encountered in repeating the latter experiment [47]), in which there is no question of foreign protein. Moreover, although complement-fixing antibodies and precipitins may appear in the serum of animals treated with preparations from urine, nearly all of the many students of this subject agree that there is no parallelism between the immunologic titer and the quantity of antigonadotropic substance physiologically determined, and that the former depends on contaminating proteins rather than on the gonadotropin itself.[48] If serums prepared by treatment with bovine pituitary extract are treated with bovine serum, the antibovine immune bodies are precipitated while the antigonadotropic activity remains.[32]

Other observations, however, favor an immunologic interpretation, or at least suggest that the antihormone is formed only under abnormal experimental conditions. Antigonadotropic activity has been ascribed to,[49] and denied [50] to, the serum of untreated human beings and animals, and was not found in human puerperal serum despite the high gonadotropic titer throughout pregnancy;[51] indeed, it is usually absent from the serum of patients long treated with preparations of chorionic gonadotropin,[52] though a positive result has recently been reported with pregnant mare serum.[53] Again when a castrate animal is linked with a normal one in parabiosis, the latter shows no sign of becoming refractory to the gonadotropic hormone produced in excess by the former,[54] though it may be passively protected by transfer of serum from an animal made refractory by injections.[55] It is claimed, too, that antigonadotropic substance is produced in response to injections of chorionic gonadotropin which has been inactivated by heat or aging or ultraviolet irradiation,[56] or of extracts from male urine practically devoid of gonadotropic activity;[57] Zondek and co-workers,[58] however, have maintained that in all such preparations there remains a residue of gonadotropic potency and also that the neutralization of the injected gonadotropin by the antihormone follows quantitative or stoichiometric laws quite unlike those governing antigen-antibody reactions, on the one hand, or enzyme reactions, on the other;[59] hence Zondek has abandoned his earlier view that the antihormone is a specific hormone-destroying enzyme belonging to the class of Abderhalden's abwehrfermente.

The antigonadotropic substance is divided between the euglobulin and pseudoglobulin fractions of the serum [8] and can be purified by iso-electric precipitation.[60] It does not arise from the gonads, as it can be formed by castrate animals; it has been urged that it is produced by the reticuloendothelial system, like true antibodies, since its formation is inhibited by "blockage" and splenectomy;[61] it has also been urged that the pineal gland contains an antigonadotropic substance.[62] Certain anterior pituitary extracts when injected intraperitoneally diminish the effect of simultaneous subcutaneous injections of extracts containing the follicle-stimulating substance, and are said to contain an "antagonist," which may be identical with the luteinizing (interstitial cell-stimulating) factor but is almost certainly distinct from the antigonadotropic substance found in serum

A curious and unexplained phenomenon which has been observed repeatedly is that, before antigonadotropic properties appear in the serum of a treated animal, there may be a phase during which the serum, far from inhibiting, augments the action of gonadotropic extract in a test animal.[63] It has been suggested that this "progonadotropic" effect represents the forma-

44. Collip.[40] Thompson and Cushing.[36]

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tion of an antihormone to the aforementioned "pituitary antagonist," but there is little direct evidence for this interpretation. The progonadotropic substance is found in the globulin fraction of serum and is active in hypophysectomized as well as in normal test animals and in males as well as in females.

ACQUIRED RESISTANCE TO OTHER PRINCIPLES

Animals become refractory to the action of prolactin, and an inhibitory substance may be demonstrated in their serum.[64] The diabetogenic effect of fresh anterior pituitary extracts in normal dogs does not persist in long treatment except with enormous doses; this might be due to increased production of insulin, but a similar phenomenon has been observed in depancreatized animals.[65] The glycostatic action on muscle glycogen cannot be maintained indefinitely, nor the growth-promoting action of purified extracts, nor the ketogenic effect; in the last case, there is some evidence that an antihormone is formed.[66] Glycotropic (anti-insulin) activity can, however, be maintained without refractoriness for long periods. The "tachyphylaxis" observed with pitressin need not be considered here.

According to Hartman[67] adrenal cortical extracts may be regarded as consisting of two fractions, one of which is life maintaining while the other ("Na factor") causes sodium retention in normal animals. Intravenous or intraperitoneal (but not subcutaneous) injections of the latter gradually lose in efficacy, but the refractory state produced yields to similar extracts from adrenals of another species. The serum of refractory animals, or its pseudoglobulin fraction, confers resistance against the adrenal extract originally used in fresh test animals (dogs). Such resistance can develop in adrenalectomized animals, and is not elicited by chemically pure preparations, such as corticosterone.

The practical importance of finding means to control metabolism in hyperthyroidism has led to many studies of "antithyroid" substances, not all of which can be discussed here. The "antithyroidin" of Möbius[68] was obtained from the blood of thyroidectomized sheep, and was followed by the "catechin" of Blum[69] from normal bloods, apparently identical with the preparation marketed as "tyronorman," which has been widely if not always critically used in the treatment of exophthalmic goiter[70] and which is said to possess antithyrotropic as well as antithyroid properties[71] but appears to be associated with the fat-soluble fractions of the blood rather than with the proteins. True antibodies appear in immunization with thyroglobulin but do not lead to refractoriness to the metabolic action of this substance.[72]

Parathyroid preparations soon lose their hypercalcemic activity when continuously administered, but there is no reason to believe that an antihormone is produced. Insulin may be given to diabetic patients for years without development of resistance, yet the phenomenon is sometimes encountered, and in one case the blood seemed to destroy or inhibit insulin;[73] the name "anti-insulin" has been used at various times, both for hyperglycemic factors in crude pancreatic extracts and for the glycotropic factor of the anterior lobe of the pituitary. With chemically pure estrogens, androgens, progesterone or epinephrine there is in general no sign of acquired resistance to the ordinary physiologic effects, though animals may display ability to adapt themselves to the damaging effects of excessive doses;[74] one is not justified in speaking of specific antihormones in these cases. Attempts to produce complement-fixing antibodies by using estrogens and androgens as haptens with pig serum as a carrier have succeeded, but the physiologic actions of these substances are not inhibited.[75]

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Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING ARTICLE.

THE COUNCIL WISHES TO EXPRESS ITS APPRECIATION TO DR. LAURISTON S. TAYLOR FOR THE PREPARATION OF THIS ARTICLE AND TO THE CONSULTANTS ON ROENTGEN RAYS FOR THEIR ASSISTANCE. THE CONSULTANTS ON ROENTGEN RAYS ARE DRS. A. U. DESJARDINS, CHAIRMAN, WILLIAM E. CHAMBERLAIN, A. C. CHRISTIE, E. C. ERNST, GIOACCHINO FAILLA, F. M. HODGES, J. T. MURPHY, R. R. NEWELL, E. P. PENDERGRASS, U. V. PORTMANN, L. S. TAYLOR AND J. L. WEATHERWAX.

HOWARD A. CARTER, Secretary.

X-RAY PROTECTION

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WASHINGTON, D. C.

Proposals covering the broader aspects of x-ray and radium protection were adopted by the International Congress of Radiology in 1928, 1931, 1934 and 1937. These have formed a basis of more detailed recommendations by the National Advisory Committee on X-Ray and Radium Protection composed of representatives of the various radiologic and medical societies and the x-ray equipment manufacturers. However, certain types of questions in this matter frequently confront the physician and consequently it may be of value to discuss briefly a few of them.

SHIELDING FROM DIRECT RADIATION

Complete X-Ray Shielding.—In the deep and superficial therapy rooms it is most desirable in general that the nurse or technician be completely isolated from the

patient, since that affords complete protection from both direct and scattered radiation. To realize this practically, the treatment room should be constructed of some completely protective material, and observation by the nurse should be only through amply protecting lead glass.

Three types of such room construction are possible: (1) metallic lead walls, (2) protective plaster walls, such as barium plaster, and (3) poured concrete or solid concrete block wall. In all cases, considerable care must be given to the details of construction. Each of the three types of protective material has its own place depending on such factors as the operating voltage and the intensity of the radiation against which protection is sought.

In general the barium plaster walls find best application in the diagnostic and superficial therapy voltage range; lead, in the superficial therapy and moderate voltage deep therapy range (up to 220 kilovolts), and concrete for all higher voltage radiations. When one is using either plaster or concrete it should be borne in mind that for the same degree of protection one must use a weight of material per square foot which is usually considerably greater than pure lead. The efficiency of concrete as a protective material increases rapidly with thickness and increasing excitation voltages.

Internationally Adopted Thickness for Lead Protection

X-Rays Generated by Peak Voltages Not in Excess of Kv.	Minimum Equivalent Thickness of Lead, Mm.
75	1.0
100	1.5
125	2.0
150	2.5
175	3.0
200	4.0
225	5.0
300	9.0
400	15.0
500	22.0
600	34.0

The lead protection thicknesses adopted internationally are given in the accompanying table. The thicknesses given in this table will reduce a beam having a dosage rate of 6 roentgens per minute at 100 cm. from the target to the safe tolerance level just behind the barrier. It is obvious, therefore, that for higher or lower dosage rates (measured at 1 meter) or for greater distances from a permanently located x-ray tube the necessary lead protection may increase or decrease depending on conditions. Thus a spacious therapy room will not require as much protection per square foot as a small and cramped room. These factors have been considered in detail in other publications.

Partial X-Ray Shielding.—The next type of shielding is one that divides the protection into two classes: first, that which protects from direct radiation from the tube and, second, that which protects from the scattered radiation from the patient and surrounding objects.

It must be clearly understood, however, that increase in protection from one source must keep pace with increase in protection from the other. It is insufficient to provide perfect protection from direct radiation while neglecting largely the scattered radiation. The two degrees of protection should be so adjusted that the potential danger to the patient is about equal. At present the customary protection from scattered radiation is much less effective than from the direct radiation from the tube.

Although still used, lead-glass tube bowls are obsolete; their use is definitely dangerous and should be discouraged.

For therapeutic x-ray tubes, the surrounding shield should be sufficient to reduce the dosage rate of the undesired radiation to a level not exceeding 1 per cent, and preferably less, of that of the main beam when using the heaviest filtration. For diagnostic x-ray tubes the surrounding shield should reduce the radiation as measured at the position of the radiologist to a level at least as low as the dosage rate at the same point due to radiation scattered from the patient's body. It is obviously difficult to provide a general formula for such protection because of the wide variety of conditions encountered clinically.

There are many definite advantages to the metallic tube enclosures now commonly used. The electrical protection is nearly perfect when the shield is grounded. Also it is easy and desirable to cover the treatment window with a permanent aluminum or copper filter and a layer of asbestos. The physician is thereby first assured of some protection against the soft rays; second, in case the target should melt off or the tube break, the possibility of any hot parts falling on the patient is decreased; third, if, when one is using a water-cooled tube, the water connection leaks or breaks there is slight possibility of a high tension short circuit occurring to the patient.

Much can be said at this time in favor of the completely oil immersed x-ray tube for high voltages, and its development promises to be one of the most important in the improvement of x-ray technic. When the tube and transformer are in the same grounded case or connected by shielded cables, the electrical hazard is appreciably lessened. Such a unit is also adaptable to a satisfactory x-ray shielding.

PROTECTION FROM SCATTERED RADIATION

Up to the present too little attention has been paid to scattered radiation and it must be emphasized that one must not overprotect from direct while neglecting even in part the scattered rays. Operators should frequently inspect the equipment to be certain that no part of the protection has become accidentally displaced. In diagnostic work the patient needs no special protection from direct or scattered radiation, since the exposures are short and the intervals between such exposures long.

In therapy, the protection of a patient is important but is frequently neglected. Its importance increases for patients having frequent and long treatments. The treatment part of the body should be sharply defined and the remainder of the body carefully covered with sufficient lead rubber in cases in which the tube is an open bowl or otherwise poorly protected. If some part of the patient's body comes much closer to the target than the part which is being treated, the protection afforded by the shielded enclosure may not be sufficient. For cases in which the beam is sharply defined, such as from a large tube shield close to the patient, little or no extra covering for the patient is necessary.

When a patient lies on a metal table there will be a certain amount of secondary radiation scattered back to the patient from the table. This of course applies to all material and air in the direct beam or in fact near the patient. While in a great many cases this can be neglected, there are times when it must certainly be considered.

It cannot be overemphasized that the operator should remain outside the treatment room at all times when the tube is in operation. The controls must be conveniently located at a point outside the room or in a booth, either of which affords complete protection. Particular care must be given to the lead glass window to insure that it has a high enough protective coefficient. This is neglected in too many hospitals. In addition the window should afford a good view of the patient and high tension meters at the same time.

Protection in Roentgenoscopy and Roentgenography.—The danger from roentgen radiation is probably greater to the physician in roentgenoscopy and roentgenography than from any other source. Roentgenoscopic and roentgenographic apparatus is also used to a much greater extent than any other type and evidently till quite recently it has received the least attention from the point of view of protection. As already indicated, the danger is to the physician and not to the patient. Also the greatest source of this danger is from the scattered radiation and not the direct, as the latter is usually limited.

I will now assume that the tube is properly shielded in some way that has been outlined so that only a limited beam of direct radiation strikes the patient. By the use of adjustable diaphragms the field should be set at such a size as to be entirely included on the fluorescent screen. Unfortunately this has been considered the best protection or all that was necessary. However, actual observation with a hand roentgenoscope shows a large amount of scattered radiation on all sides of the screen of the patient and in the usual positions of the physician.

Measurements of scattered radiation around screening stands have been made by means of ionization chambers. In many cases the dose at the normal position of the physician has greatly exceeded the "tolerance dose." Curves have been plotted showing this distribution and its correction by the addition of proper screens.

Several direct remedies may be applied and developed to the point at which the further increase in safety is inconsistent with construction and general adaptability. There is no sharp line of demarcation for this, and the final solution can be worked out only by the roentgenologist and the manufacturer together.

First, the screen itself should be effectively backed with a lead glass of which the protective coefficient is to be determined by the voltage used.

Next, it is desirable that the fluorescent screen have thin sheet lead wings which overlap the glass and extend several inches to each side and top. Beneath the glass, and again overlapping, should hang some form of apron, preferably of lead rubber, so supported that the roentgenologist can reach the patient with his hands when necessary. This would give the roentgenologist good protection under all conditions. The increase in weight can be counterbalanced so as to permit freedom of motion. All the protection described applies principally to radiation scattered from the patient, air and surrounding objects.

In the case of horizontal screening and roentgenography, similar precautions should be taken when possible with regard to the fluorescent screen. Good protection is afforded the operator with such equipment by extending a lead shield of proper thickness along the side of and overlapping the patient and tube as far as practicable. If the shield is so mounted as to move with the tube, it need be only from 2½ to 3 feet wide; otherwise it should extend the length of the table.

Body Protection.—The roentgenologist must at times use certain special forms of body protection. In general, however, the permanent protection should be sufficient so that he need only use protecting gloves and aprons. The use of goggles and the like in a poorly protected room gives a false sense of security and may lead to carelessness and thus to injury.

For adequate protection, gloves and aprons should have a lead equivalent of 0.5 mm. The rubber should be soft, pliable and kept free from cracks. White cotton gloves worn under the lead rubber gloves will make the lead rubber gloves last longer. The requirements for such protection have been discussed sufficiently in the proposals adopted by the second International Congress. It need only be emphasized that in the use of gloves and aprons the busy roentgenologist must use great care and not expect too much of them.

By means of so crude a device as a hand roentgenoscope, a roentgenologist can obtain quickly and readily some measure of the scattered radiation in his rooms. If he first accustoms his eyes to complete darkness for ten minutes and then is able to perceive fluorescence on the screen, he should take some immediate measure to shut off the leakage. In the same way he can examine his other protective materials such as glass and rubber. A film test, while not very accurate, can indicate to the radiologist the exposure to which he is subjected in the course of a day or a week. He should make a habit of examining in the same way all new protective materials which come into his use, as well as those which are subject to change in service, and not rely merely on the statements of the salesman; faulty material is always a possibility.

PROTECTIVE MATERIALS

Lead, when used in proper thickness, affords ample x-ray protection and calls for no further discussion.

Lead glass or lead-barium glass can be made in this country of uniform density and up to 60 per cent lead and 15 per cent barium without giving too much color. Its manufacture, however, is so expensive and the demand limited, that it is not handled by most glass dealers. Domestic lead glass has a protective coefficient as high as 0.30 (most imported glasses are relatively poor). This means that for an equivalent lead thickness of say one-eighth inch the lead glass must be slightly over three-eighths inch thick. This can be secured in one plate or by adding two or more plates to give the required thickness. The efficiency is in no way affected by the laminations.

Lead rubber can readily be made with a high lead content but this is not ordinarily done. When it is supplied with sufficient lead, and is pliable and free from cracks, it affords good protection. Care and judgment in its use must be observed, however.

Protective plasters must be mixed with great care in order to insure a uniform texture. Moreover, it is not easy to know just when a sufficient mixing has been given. Next it must be laid on a specially and carefully installed metal lath and allowed to set under temperature conditions which are preferably quite constant.

An undesirable feature of barium sulfate plaster is its wide variation of opacity with voltage. In general there is a maximum x-ray opacity at about 110 kilovolts which falls off to less than one half at 200 kilovolts for thicker walls. Thus for a plaster protection at 200 kilo-

volts the thickness will be double that at 100 kilovolts for the same percentage protection. The opacity is approximately proportional to the thickness of material at lower voltages but the relation is not so simple at 200 kilovolts. Properly installed barium plaster walls afford a satisfactory protective barrier up to at least 110 kilovolts.

The use of concrete or concrete block requires the same care in installation as for that of barium plaster. In general it is inefficient in thickness of less than 4 inches. Its greatest advantages appear in thicknesses over 6 inches and for voltages above 200 kilovolts. It has the important advantage of providing structural value for a building.

Lead sheets embedded in cinder blocks are now available and provide a satisfactory means of installing pure lead protection.

THE TOLERANCE DOSE

By the so-called "tolerance dose" is meant the amount of x-ray energy that a person may receive continuously or at repeated intervals without suffering any damage to the blood or reproductive organs. This can be expressed in terms of roentgens of radiation or in terms of an erythema dose. The actual values of this dose should be stipulated by the radiologist and not the physicist. It remains for the latter to measure it within certain limits and to devise means for reducing it when necessary. Obviously, the determination of this tolerance dose is difficult and at best uncertain. The biologic factor differs too greatly among individuals to permit the use of a sharply defined tolerance. To be well beyond the danger limit one must apply a generous factor of safety to the result of any physical measurements. Kaye has summed up the tolerance doses as estimated by five investigators and from these data finds that a person may receive without injury up to one-fiftieth roentgen daily. In each case a generous factor of safety has been allowed. The fact that this figure includes a large safety factor makes it unnecessary to stipulate the quality of the radiation or to state whether the whole body is exposed or only a portion of it.

The determination of the tolerance dose can be done only empirically. A number of hospitals are first chosen as being representative. In each, every worker is carefully examined for any physical damage to blood or tissues. Where they are found to be sound, a careful record of their day is made to determine their exposure to radiation. Next the intensity of the radiation is measured with a sensitive calibrated ionization dosage meter in terms of roentgens. Dividing the number of roentgens by the number of working minutes per day gives the dose in roentgens per minute. This can be converted into any desired unit for convenience.

SOME ELECTRICAL SAFEGUARDS

By far the most important electrical precaution is complete inaccessibility of all high tension leads. This applies not alone to the permanent aerial system but especially to the flexible conductors from the rheaphores to the tube terminals. These leads are too commonly within easy reach of patient or doctor and many fatal accidents have been due to an excited patient rising on the table and touching the leads. With the recent improvements in apparatus this danger can be eliminated and every effort should be made to abolish exposed leads entirely.

It is of great importance that certain parts of the equipment be permanently connected to earth. Frequent inspection should be made to ascertain that these connections are good. Whenever possible, the center point or end of the secondary should be effectively grounded. The non-current carrying parts of control panels, timing switches and so on should also be well grounded. When a milliammeter is used in the grounded side of the high tension circuit it should be shunted by a spark gap set at a distance of 1 or 2 thousandths of an inch. This can be easily done by short-circuiting the meter with two overlapping flat metal strips and then separating the strips with a piece of tissue or cigaret paper. This protects the meter from surges.

Insulating floor coverings are always desirable and are a necessity on concrete floors where the older exposed tube leads are used. Very good grades of rubber compound flooring or mats are made which will stand a breakdown voltage of more than 100 kilovolts through the body of the material. It should be laid preferably in strips as wide as possible so that a discharge cannot take place along the surface to an edge or crack. It should be installed carefully so as to avoid cracking or straining, and the edges should be from 1½ to 2 feet from the foot position of the operator when possible. When it is being cleaned, acid or strong soapy solutions should not be used. Wiping should be done only with a damp rag and moisture should be kept from under the edges; it should be dried thoroughly before using. When in addition x-ray protection is desired for a room beneath, a lead rubber flooring can be used effectively to serve both purposes. A break in the continuity of the floor covering resulting, for instance, from the dropping of a heavy object with sharp corners would nullify all these conditions.

In some forms of apparatus the main transformer is easily accessible and the high tension is conducted away through insulating tubing. Where such leads are also accessible they should be covered with a carefully grounded metallic sheathing. This minimizes danger from shock in case the insulation breaks down.

In diagnostic equipment one of two types of switch should be used in the transformer primary circuit, namely either a hand or a foot switch so constructed that the circuit is instantly broken when the pressure is relieved; or a time switch which automatically opens the circuit at the end of a set interval. Wherever possible two switches should be used in series to minimize the danger of accidental closing of the circuit.

In the use of insulated water-cooling systems when the tube is placed at a high potential every precaution must be made to prevent leakage of water. In particular any leakage must be prevented from striking the patient, as it might cause a short circuit of the high tension. This has been discussed in connection with the lead tube shield.

Much can be said for the development of completely insulated equipment and especial credit is due the manufacturer for his efforts in developing it. One of the most important developments is the completely oil-immersed units in which tube and transformer are in a common metal tank, air sealed and effectively grounded. The electrical hazard from high voltage shock in the better types vanishes. Such units are now being manufactured up to 400 kilovolts.

It is recognized that this discussion is far from complete, but it is hoped that it will serve as a guide in examining some of the safety aspects of x-ray equipment.

But, however safe x-ray equipment is made, it is a dangerous and lethal tool in the hands of the ignorant,

careless or inexperienced operator. It should be used only by qualified radiologists and technicians. The manufacturer has performed an admirable job in working out all phases of the safety problem; most companies make only reasonably safe equipment and cannot be held liable for the inadvised use of their product. Education and the restriction of sales only to qualified people will probably go furthest in minimizing the hazard of x-ray equipment.

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

LIEBEL-FLARSHEIM DUAL WAVE SW-550, ACCEPTABLE

Manufacturer: The Liebel-Flarsheim Company, Cincinnati.

The Dual Wave SW-550 is recommended for medical and minor surgical diathermy. The unit is housed in a metal floor model cabinet. According to the firm, the Model SW-550 provides circuits for generating two wavelengths—one wavelength in the ultra-short wave range (approximately 8 meters), the other in the short wave range (approximately 24 meters).

The short wave circuit (24 meters) and the ultra-short wave circuit (8 meters) are of the tuned-plate, tuned-grid type. With both circuits the patient circuit is inductively coupled to the oscillator; a variable condenser in the patient circuit provides for resonation with the oscillator.

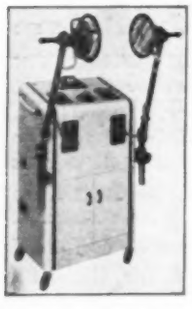
This unit employs two rectifier tubes type 966 and two oscillator tubes type WL-468. The WL-468 tubes carry the following manufacturer's rating:

A. C. (RMS) plate volt	2,500
D. C. plate milliamperes	200
Plate output watts (approximately)	400

Physical tests performed in the Council laboratory disclosed that the apparatus has an input of 1,290 watts and an output of 500 watts by the lamp load method using the treatment drum, and one turn as load pick up. After the unit had been operating for two hours the final temperature of the transformer was found to be 95 F., which is within the limits of safety prescribed by the Council.

The net weight of the unit, complete with standard accessories, is 196 pounds; the shipping weight is 303 pounds.

The inductance cable and the flat and curved treatment drums operate on short wave (24 meters) circuit. The air-spaced plates, pads, cuffs and orificial electrodes operate on ultra-short wave (8 meters) circuit. The proper wavelength is automatically delivered to the respective electrode when the leads are plugged in. Applicators are said to be protected against overload and possible damage by a power regulator tube and circuit in the output circuit.



Liebel-Flarsheim Dual Wave SW-550.

The tubes and circuit are protected by a device (the Protect-A-Tube) which automatically reduces the power and sounds a warning signal when some unusual condition threatens an overload. A line filter is incorporated in the circuit and special precautions are said to have been taken by the manufacturer to balance the circuit in order to minimize radio interference.

Evidence as to the heating capabilities of the unit were submitted by the firm and confirmed by the Council's clinical investigation. The data are as follows:

INDUCTANCE CABLE (SHORT WAVE)

Technic: Four turns of the inductance cable were wrapped around the thigh with approximately 1 inch of turkish toweling beneath for spacing. Two turns were taken high up on the thigh; approximately 4 inches of spacing was allowed for inserting the thermocouple, and two more turns were taken below the incision.

Average temperatures of six tests:
Deep muscle: initial, 98.5 F.; final, 107.7 F.

FLAT TREATMENT DRUM (SHORT WAVE)

Technic: The treatment drum was applied over the thigh, as close to the skin and as nearly over the point where the temperatures were read as the thermocouples would permit.

Average temperatures of six tests:
Initial, 99.0 F.; final, 105.4 F.

CURVED TREATMENT DRUM (SHORT WAVE)

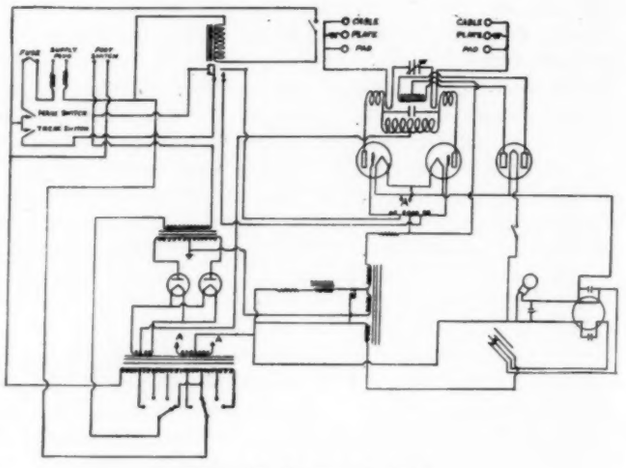
Technic: The curved treatment drum was applied over the thigh, as close to the skin and as nearly over the point where the temperatures were read as the thermocouples would permit.

Average temperatures of six tests:
Initial, 98.8 F.; final, 105.4 F.

SPACED PLATE (ULTRA-SHORT WAVE)

Technic: Two disks, one 5½ inches in diameter and one 9½ inches in diameter, were applied in a plane to the anterior portion of the thigh and curved so that each portion of the plate was approximately the same distance from the skin surface. The proximal edges of the disks were 2 to 2½ inches apart, at the center of which space the thermocouple was inserted. Both disks were spaced approximately 1 inch from the patient's skin.

Average temperatures of six tests:
Initial, 98.8 F.; final, 107.3 F.



Schematic diagram of circuit.

CUFFS (ULTRA-SHORT WAVE)

Technic: Two ultra-short wave cuff electrodes with approximately 1¼ inch turkish towel spacing were wrapped around the thigh with approximately 2½ inches space between the proximal edges. The thermocouples were inserted at the midpoint.

Average temperatures of six tests:
Initial, 98.4 F.; final, 106.6 F.

PAD (ULTRA-SHORT WAVE)

Technic: Two ultra-short wave pad electrodes 6 by 8½ inches were spaced approximately 1½ inches with turkish toweling and curved to fit the contour of the thigh. Approximately 2 inches was left between the proximal edges at the center of which space the thermocouples were inserted.

Average temperatures of six tests:
Initial, 97.9 F.; final, 105.7 F.

The following six tests show the results with use of an orificial electrode in connection with the ultra-short wave circuit of the Model SW-550.

Time	Temperature	Time	Temperature	Time	Temperature
5	104	5	104	5	105
10	109	10	106	10	108
15	110	15	111	15	109
20	110	20	110	20	110
5	105	5	105	5	104
10	107	10	108	10	106
15	110	15	109	15	109
20	111	20	110	20	111

In all cases the Chapman electrode was used and was specially drilled so that a thermometer could be passed through and actually come in contact with the cervical tissue.

The electrode was connected to the pad terminal on the apparatus (ultra-short wave) and a special lead incorporating a condenser was used for tuning this application. For a return path the large air-spaced plate was connected to the opposite

spaced-plate terminal and the plate was positioned at approximately 4 inches above the abdomen.

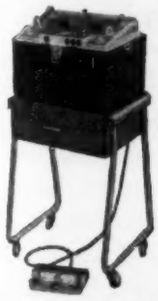
The Council voted to accept the Liebel-Flarsheim Dual Wave SW-550 for inclusion on its list of accepted devices.

BIRTCHER MODEL 799 ELECTRO-SURGICAL UNIT ACCEPTABLE

Manufacturer: The Birtcher Corporation, 5087 Huntington Drive, North, Los Angeles, Calif.

The Birtcher Model 799 Electro-Surgical Unit is said by the manufacturer to be designed so that it can be used for all major and minor technics of electrosurgery. The unit is provided with a tube circuit for cutting and a spark gap circuit for coagulation, and the manner in which it is designed permits simultaneous use of the two circuits.

The spark gap circuit, indicated on the operating panel by a red pilot light and red dial, is located on the left hand side of the instrument, and current for this circuit is supplied by depressing the red part of the triple pedal foot switch. On the right hand side is located the tube cutting circuit, indicated by a green pilot light and green dial on the operation panel; depressing the green part of the foot switch supplies current for this circuit. Depressing the center pedal makes it possible for the operator to mix or blend the currents. The color distinction which is used provides a visual means of distinguishing between the two circuits. An auditory distinction is also employed; the spark gap circuit, when in operation, makes a "sizzling" sound, and the tube cutting circuit a radio tone sound.



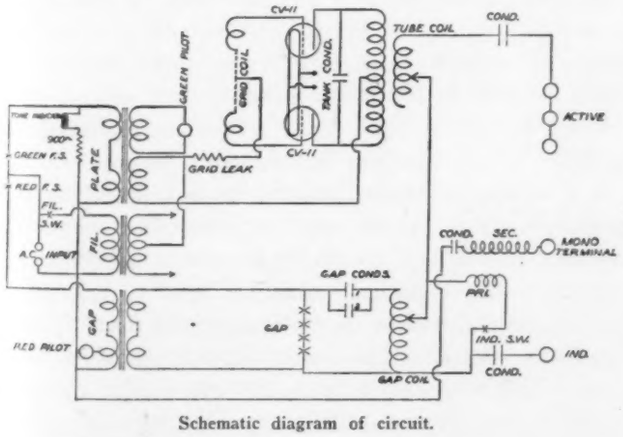
Birtcher, Model 799 Electro-Surgical Unit.

Standard equipment with the Birtcher Model 799 Electro-Surgical Unit includes dual footswitch, one line cord, one No. 795 Electro-Surgical set including five assorted loops and blades, one metal indifferent electrode with connection cord and two chromium plated steel rods for insertion in the control dials of the unit. The unit uses type CV-11 power tubes.

A report concerning the radio interference caused by the unit was submitted by the firm. It pointed out that at a distance of 1,500 feet no interference could be detected in the ultra short wave band or in the broadcast band. As the receiver used was an extremely sensitive one, the firm believes that the average household broadcast receiver would experience no interference.

Measuring the wavelengths with the wave meter gave the following fundamental wavelengths: for the tube circuit about 2,250 kilocycles, for the gap circuit about 7,025 kilocycles.

The Council's clinical investigation revealed that the apparatus can be used to cover the field of electrosurgery. The unit's special feature which combines tube-current cutting with spark-gap desiccation for hemorrhage control is a useful innovation. The mechanical construction of the equipment seemed satisfactory.



Schematic diagram of circuit.

The Council voted to accept the Birtcher Electro-Surgical Unit Model 799, for inclusion on its list of accepted devices.

FINDLEY FOLDING PESSARY ACCEPTABLE

Manufacturer: American Medical Specialties Company, Inc., 12 East Twelfth Street, New York.

The Findley Folding Pessary is an appliance made in the shape of the conventional vaginal pessary but different in that a section at each end is replaced by a solid soft rubber insert. This rubber insert acts as a hinged joint so that the lateral rigid arms of the hard rubber may be swung together.

Findley Folding Pessary.

The firm states: "The Findley Folding Pessary enables the Gynecologist to place the correct sized pessary through the smallest introitus which because of the non-conformability of the regular type pessary is not possible. . . . It may be used on postpartum cases as early as ten days after delivery, or in most vaginal cases without putting strain on the pelvic floor. . . . The antero-posterior pressure of the walls holds the pessary in place and prevents it from sliding out inopportunely."

Evidence was submitted by the firm to substantiate the usefulness of the device.

The Council's clinical investigation of the device revealed that the pessary can be introduced more easily through the vaginal introitus than a solid rubber pessary. It holds the uterus in position as satisfactorily as a device made of solid rubber. The main advantages are the greater ease and the lessened discomfort associated with its introduction. A disadvantage lies in the fact that the soft rubber hinges are less easy to keep clean and free of bacterial invasion than is a device made of hard rubber. It is of value in cases in which the pain and difficulty of insertion of the usual hard rubber pessary would preclude its use.

The Council voted to accept the Findley Folding Pessary for inclusion on its list of accepted devices.

Council on Foods and Nutrition

ACCEPTED FOODS

THE FOLLOWING ADDITIONAL FOODS HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON FOODS AND NUTRITION OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO ACCEPTED FOODS.

FRANKLIN C. BING, Secretary.

PREPARATIONS USED IN THE FEEDING OF INFANTS (*See* Accepted Foods, p. 156).

The Larsen Company, Green Bay, Wis. Product Distributed by Jack Sprat Foods, Inc., Marshalltown, Iowa.

JACK SPRAT BRAND STRAINED VEGETABLES WITH BEEF AND LIVER CONCENTRATES, a canned, strained mixture of carrots, potatoes, tomatoes, peas, celery, spinach, soya bean, beef extract and liver extract.

Analysis (submitted by manufacturer).—Moisture 85.3%, total solids 14.7%, ash 1.3%, fat (ether extract) 0.1%, proteins (N × 6.25) 3.2%, crude fiber 0.7%, carbohydrates other than crude fiber (by difference) 9.4%, calcium 0.031%, phosphorus 0.072%, iron 0.0014%.

Calories.—0.51 per gram; 15 per ounce.

Product distributed by Red & White Corporation, Chicago.

RED & WHITE BRAND STRAINED VEGETABLES WITH BEEF AND LIVER CONCENTRATES, a canned, strained mixture of carrots, potatoes, tomatoes, peas, celery, spinach, soya bean, beef extract and liver extract.

Analysis (submitted by manufacturer).—Moisture 85.3%, total solids 14.7%, ash 1.3%, fat (ether extract) 0.1%, proteins (N × 6.25) 3.2%, crude fiber 0.7%, carbohydrates other than crude fiber (by difference) 9.4%, calcium 0.031%, phosphorus 0.072%, iron 0.0014%.

Calories.—0.51 per gram; 15 per ounce.

Product distributed by Schwabacher Bro's. & Co., Inc., Seattle.

HAPPY HOME BRAND STRAINED VEGETABLES WITH BEEF AND LIVER CONCENTRATES, a canned, strained mixture of carrots, potatoes, tomatoes, peas, celery, spinach, soya bean, beef extract and liver extract.

Analysis (submitted by manufacturer).—Moisture 85.3%, total solids 14.7%, ash 1.3%, fat (ether extract) 0.1%, proteins (N × 6.25) 3.2%, crude fiber 0.7%, carbohydrates other than crude fiber (by difference) 9.4%, calcium 0.031%, phosphorus 0.072%, iron 0.0014%.

Calories.—0.51 per gram; 15 per ounce.

UNCLASSIFIED AND MISCELLANEOUS FOODS—BAKING POWDER, CREAM OF TARTAR AND BAKING SODA (*See* Accepted Foods, 1939, p. 376).

L. H. Kassel & Co., Fort Worth, Texas.

DIAL BRAND BAKING SODA, conforming to U. S. P. standards for pure sodium bicarbonate.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JANUARY 11, 1941

ANNUAL DUES NOW PAYABLE

For the convenience of those who have not paid their Fellowship dues for the coming year, a colored slip is enclosed in this issue of THE JOURNAL. This insert takes the place of a personal bill. When folded and sealed, it forms a return envelop already addressed and requiring no postage. If your dues are not paid for the coming year, please use the colored form and remit now so that no further reminder need be sent. All the periodicals of the Association with their respective subscription prices are listed on this slip, which affords an opportunity not only to pay the subscription to THE JOURNAL but also to enter subscriptions for one or more of the special journals and for *Hygeia,* the Health Magazine.

THE OLD CONGRESS PASSES, THE NEW BEGINS

The Seventy-Sixth Congress came to a close automatically January 3 at noon without completing action on a wide variety of proposals of interest to the medical profession. Included in these proposals were reflections of many peculiar conceptions of difficulties with the American system for the distribution of medical care and even stranger notions as to how defects might be corrected. Undoubtedly most of the proposals were prompted by sincere, humanitarian motives.

The expiration of the Congress has wiped the legislative slate clean of the Wagner national health bill and the Wagner-George hospital construction bill, both of which died in the House Committee on Interstate and Foreign Commerce. A similar fate, but in various committees, overtook such measures as the Mead hospital construction bill, the Tolan bill to subject injured federal employees entitled to the benefits of the United States Employees' Compensation Act to the chiropractic thrust, the McCormack bill to compel the Army and Navy Medical Corps to accept graduates of substandard schools, cult or otherwise, and the so-called Capper-Epstein compulsory health insurance bill. Federal appropriations which failed to be approved were proposed in bills to devolve on the United States Department of Labor jurisdiction over industrial conditions hazardous to the health of employees, to enable the states better to control various types of diseases, such as pneumonia, influenza, the common cold, tuberculosis and epilepsy, and to foster researches, investigations, experiments and studies relating to the cause, diagnosis and treatment of dental disease. The appointment of female dietitians and female physical therapy aids in the Medical Department of the Army failed to receive Congressional approval, as did also a proposal to establish a Chiropody Corps in the Army and Navy.

While a bill proposing to establish a federal department of health, a consummation long advocated by the American Medical Association, was not advanced along its legislative course, the President did, under authority of the Reorganization Act, initiate what possibly may be the beginning of a movement to associate in the Federal Security Agency functions exercised by various branches of the government having to do with matters pertaining to health. To that agency, for example, have been transferred the United States Public Health Service from the Treasury Department, the Food and Drug Administration from the Department of Agriculture, and the administration of St. Elizabeth's Hospital, Freedmen's Hospital and the Columbia Institution for the Deaf from the Department of Interior.

The Ramspeck civil service extension bill was approved by the President November 26 but before enactment the Hatch amendment was stricken from it. This proposed, in effect, to pave the way for the appointment of graduates of substandard medical schools and of cult schools in the United States Public Health Service, the Veterans' Administration, the Indian Service and to positions in other civil branches of the government. Action was not taken on the Murray-McCormack proposal to exempt medical and dental students, interns and resident physicians of recognized hospitals from the Selective Training and Service Act and to provide for the appointment of graduates of recognized medical and dental schools as commissioned officers in the Medical Department Reserve, Officers' Reserve Corps. The belief seems to prevail that through administrative procedures the desirable objectives sought by this bill can be obtained without the enactment of any additional legislation.

The establishment of a National Physical Fitness Institute, as contemplated in a bill introduced by Senator Walsh of Massachusetts, did not receive consideration by the Senate Committee on Education and Labor, to which the bill was referred, and the House Committee on Education failed to give attention to a bill sponsored by the American Association for Health, Physical Education, and Recreation and introduced by Representative Schwert of New York. This measure

proposed to enact a National Preparedness Act of 1940 for Health Education, Physical Education, and Recreation in Schools and School Camps.

Again the Congress has ended without providing adequate facilities for housing the Army Medical Library and Museum. The sum of $130,000 was authorized for the preparation of plans for a new building. Once more THE JOURNAL records the fervent hope that this urgent project will not be longer delayed. The Library and Museum contains an invaluable, unique and irreplaceable collection of scientific material at present housed in a veritable fire trap. Any delay in this matter is too long.

The first session of the Seventy-Seventh Congress convened immediately on the expiration of the third session of the Seventy-Sixth Congress. Many proposals of interest to physicians will undoubtedly be presented to the new Congress for consideration. Some of the measures here mentioned, it has already been announced, will be introduced in new form. THE JOURNAL will continue, as in the past, to keep physicians advised promptly concerning the more important of such proposals.

A NEW COMPLEX INFLUENZA VACCINE

The new vaccine against influenza recently described by Horsfall and Lennette [1] of the Rockefeller Foundation challenges conventional immunologic theory. The vaccine seems to have been a purely accidental discovery. About a year ago, numerous normal ferrets were inoculated intranasally in the Rockefeller Foundation laboratory with the 1939 strain of human influenza virus. During the course of the resulting influenza, four of these animals developed a concurrent infection with ferret distemper. In order to prevent the spread of this epizootic to the stock animals, a formalized vaccine was prepared from the lungs and spleens of these ferrets and injected subcutaneously into each of the 157 normal animals of the ferret colony. Similar vaccines had been found effective in preventing the spread of ferret distemper on previous occasions. Two days after inoculation with this presumptive distemper vaccine, groups of the vaccinated ferrets were inoculated intranasally with massive doses of three antigenically distinct strains of human influenza virus. To the great surprise of the New York investigators, none of these animals developed experimental influenza. Injection of the presumptive distemper vaccine had apparently resulted in immunity effective against at least three antigenically different strains of influenza virus. This is a broader and more effective immunity than results from actual infection with the influenza virus.[2]

After numerous failures it was found possible to reproduce this multivalent vaccine by inoculating ferrets simultaneously with mixtures of human influenza virus and canine distemper virus. The formalized vaccines thus produced not only protected ferrets against canine distemper but afforded almost absolute protection against massive intranasal doses of all strains of human influenza virus thus far tested. These vaccines have been tested on human volunteers. In all instances they produced a definite increase in multivalent virucidal antibodies, apparently active against the available strains of human influenza virus.

In their latest studies of the new complex vaccine, Horsfall and Lennette [3] have ruled out the possibility that the observed effects are due to antigenic similarities between the influenza and distemper virus. Their evidence has led them to the conclusion that under the influence of concurrent distemper infection the human influenza virus undergoes antigenic alterations which render it less virulent, less highly specific and more broadly antigenic than the original virus. The exact nature of this hypothetical biochemical mutation is now under investigation.

Routine vaccinations of ferrets with viable human influenza virus does not result in the development of a complete immunity even against homologous strains, although a partial homologous immunity may result.[4] The demonstration that the new vaccine stimulates the development of a multivalent immunity, therefore, is one of the most promising practical leads in research of recent decades. Whether or not similar vaccines will be effective with other virus diseases has not yet been determined.

VITAMIN K AND CHOLEMIC BLEEDING

The fascinating story of the discovery of vitamin K has been the subject of editorial comment in THE JOURNAL[1] and of two comprehensive preliminary reports.[2] More recent contributions deal with the therapeutic possibilities of the vitamin particularly in the hemorrhagic diathesis associated with obstructive jaundice and prothrombin deficiency.

Dam of Copenhagen observed that chicks reared on an artificial fat free diet developed cutaneous and intramuscular hemorrhages and erosions of the gizzard. He reported in 1935 that the deficiency factor responsible for the hemorrhagic disease in these chicks was a fat soluble substance which he designated as "koagulations" vitamin, or vitamin K. The vitamin therefore

1. Horsfall, F. L., Jr., and Lennette, E. H.: Science **91:** 492 (May 24) 1940.
2. Horsfall, F. L., Jr., and Lennette, E. H.: J. Bact. **39:** 56 (Jan.) 1940.
3. Horsfall, F. L., Jr., and Lennette, E. H.: J. Exper. Med. **72:** 247 (Sept.) 1940.
4. Smith, Wilson; Andrews, C. H., and Laidlaw, P. P.: Brit. J. Exper. Path. **16:** 291 (June) 1935. Francis, Thomas: J. Exper. Med. **69:** 283 (Feb.) 1939.

1. Vitamin K, editorial, J. A. M. A. **113:** 417 (July 29) 1939.
2. Snell, A. M.: Vitamin K: Its Properties, Distribution and Clinical Importance, J. A. M. A. **112:** 1457 (April 15) 1939. Snell, A. M., and Butt, H. R.: Supplementary Report on Vitamin K, ibid. **113:** 2056 (Dec. 2) 1939.

may be defined as a specific fat soluble substance the absence of which in the diet of chicks causes the blood to become slow in clotting.

Vitamin K is widely distributed in nature. Concentrates of the vitamin have been prepared from alfalfa and from putrefied fish meal. The human being obtains vitamin K from the diet and from bacterial activity in the intestine. A deficiency develops when absorption of this substance from the intestine is interrupted. Faulty absorption occurs when bile is excluded from the intestine. Without bile or bile salts the vitamin cannot be absorbed.

The next problem was to isolate the vitamin in a pure form and to synthesize it. Dam, Karrer and their co-workers [3] isolated the vitamin in a pure or nearly pure form. Almquist and Klose [4] in this country announced the discovery of the antihemorrhagic activity of pure synthetic phthiocol. They expressed the opinion that phthiocol is probably the simplest member of a homologous series of antihemorrhagic substances. Phthiocol was first isolated by Anderson and Newman from the pigment of Microbacterium tuberculosis. McKee, Binkley, MacCorquodale, Thayer and Doisy [5] demonstrated that the structure of vitamin K is represented by the formula 2-methyl-3 phytyl-1, 4-naphthoquinone. The most potent of the synthetic preparations so far assayed is 2-methyl 1, 4-naphthoquinone.

In the course of continued research, a hemorrhagic diathesis in the presence of jaundice was found to be the result not of any alteration in the amounts present of calcium, bilirubin, platelets, fibrinogen or thromboplastin but of lack of vitamin K with a deficiency in levels of prothrombin. Hawkins and Whipple have described in dogs with bile fistula a tendency to bleed which is prevented by feeding whole bile. Hawkins and Brinkhous showed that the bleeding is due to deficiency of prothrombin. Quick, Stanley, Brown and Bancroft suggested that low prothrombin values may occur in obstructive jaundice. Warner, Brinkhous and Smith [6] demonstrated that the bleeding tendency in patients with obstructive jaundice and biliary fistula is due to a deficiency of prothrombin and that with restoration of bile to the intestine the level of prothrombin gradually returns to normal and the bleeding ceases. Feeding of alfalfa extract rich in vitamin K, in addition to bile, caused a more rapid return of the prothrombin level to normal.

The composition of prothrombin is not known. The substance is identified by its capacity to form thrombin. Smith, Warner and Brinkhous demonstrated the intimate relationship between plasma prothrombin and liver function by damaging the livers of dogs with chloroform or by partial hepatectomy in rats. In the light of recent research it appears probable that the seat of formation of prothrombin is the liver. Vitamin K is essential to the process of coagulation of blood. It is ingested in our diets and is absorbed from the intestinal epithelium in the presence of bile.

Clinical application has demonstrated the significance of vitamin K in restoration of the plasma prothrombin to a normal level and the importance of bile salts in influencing its absorption from the intestinal tract. Butt, Snell and Osterberg [7] reported 127 cases of jaundice of various types. In the majority, bleeding has been adequately controlled by the administration of concentrates of vitamin K and bile salts. In a later communication the same authors [8] report on the use of phthiocol in ten cases of hypoprothrombinemia. In each instance the elevated prothrombin time was reduced to a near normal level. Rhoades and Fliegelman [9] report on the effect of 2-methyl 1, 4-naphthoquinone, the most potent of the synthetic preparations so far assayed. Ten patients with demonstrated prothrombin deficiencies responded satisfactorily to doses of from 1 to 4 mg. a day orally.

In a recent communication Andrus and Lord [10] published a report of twenty-two cases of biliary disease and low prothrombin level in which vitamin K and bile salts were administered. They were able uniformly to bring about a cessation of bleeding. In a more recent group of thirty-eight cases these authors used the synthetic substance 2-methyl 1, 4-naphthoquinone. They state that this substance is inexpensive and that intramuscular injection of it dissolved in corn oil is so simple and effective that they believe it to be the simplest method of administration in the treatment of prothrombin deficiencies. When it is given by injection the presence of bile salts in the intestinal tract is not necessary for its absorption and its effect is evident within a few hours. All experimental and clinical observations tend to show that the integrity of the hepatic parenchyma is the controlling factor, since it is the seat of formation of prothrombin and of the synthesis of vitamin K. Thus vitamin K is ineffective in the presence of cirrhosis of the liver or a severe hepatitis. It is without value in hemophilia or in thrombocytopenic purpura, since in these cases there is no deficiency in prothrombin or vitamin K.

3. Dam, H.; Geiger, A.; Glavind, J.; Karrer, P.; Karrer, W.; Rothschild, E., and Salomon, H.: Isolierung des Vitamins K in hochgereinigter Form, Helvet. chim. acta **22**: 310 (March) 1939.

4. Almquist, H. J., and Klose, A. A.: The Antihemorrhagic Activity of Certain Naphthoquinones, J. Am. Chem. Soc. **61**: 1611 (June) 1939.

5. McKee, R. W.; Binkley, S. B.; MacCorquodale, D. W.; Thayer, S. A., and Doisy, E. A.: The Isolation of Vitamin K_1 and K_2, J. Am. Chem. Soc. **61**: 1295 (May) 1939.

6. Warner, E. D.; Brinkhous, K. M., and Smith, H. P.: Bleeding Tendency of Obstructive Jaundice: Prothrombin Deficiency and Dietary Factor, Proc. Soc. Exper. Biol. & Med. **37**: 228 (Jan.) 1938.

7. Butt, H. R.; Snell, A. M., and Osterberg, A. E.: The Preoperative and Postoperative Administration of Vitamin K, J. A. M. A. **113**: 383 (July 29) 1939.

8. Butt, H. R., and Snell, A. M.: Phthiocol: Its Therapeutic Effect in the Treatment of Hypoprothrombinemia Associated with Jaundice: A Preliminary Report, Proc. Staff Meet., Mayo Clin. **14**: 497 (Aug. 9) 1939.

9. Rhoades, J. E., and Fliegelman, M. T.: The Use of 2-Methyl-1, 4-Naphthoquinone (A Synthetic Vitamin K Substitute), J. A. M. A. **114**: 400 (Feb. 3) 1940.

10. Andrus, W. D., and Lord, J. W., Jr.: Clinical Investigations of Some Factors Causing Prothrombin Deficiencies, Arch. Surg. **41**: 596 (Sept.) 1940.

Current Comment

ACETYLSALICYLIC ACID DEATHS

Recently an editorial on the toxicity of acetylsalicylic acid appeared in these columns.[1] Since that time several communications have been received commending THE JOURNAL for publishing the editorial. One correspondent asserted that he knew of two instances in which only prompt medical attendance saved the lives of two colleagues who had ingested the drug. He also was aware of a prominent dermatologist who developed such intense pharyngeal and laryngeal edema after taking aspirin that a tracheotomy was about to be performed when the edema began to subside. Again, an allergist had informed him of at least five deaths attributed to acetylsalicylic acid. Another correspondent wrote of a patient who had taken 250 grains (16 Gm.) of acetylsalicylic acid daily for a period of ten days. The patient recovered following treatment directed chiefly toward elimination of the drug, control of acidosis and relief of other symptoms. There must be many more cases of drug intoxication or poisoning than are reported in medical literature. Often only by accident are these brought to the attention of the medical profession. Obviously case reports of such conditions affecting human beings are an invaluable contribution to our practical knowledge of toxicology. On the other hand, the toxicity of aspirin, in relation to the amounts used annually, still must be rated as low.

DENSITY OF WORLD POPULATIONS

Some regions of the earth's surface are much more heavily populated than others. For example, the continents of North and South America are far less crowded in proportion to the ability of the land to support their inhabitants than is the continent of Europe. Pearl [1] points out that this contrast is not necessarily permanent; at least some of the nations of the Western Hemisphere are growing in population at rates which if continued will sooner or later materially alter the favorable ratios which they now possess. There are six attributes of populations, he says, that are generally regarded as of primary importance: (1) the density of aggregation per unit of land area, (2) the net over-all percentage rate of growth per unit of time, (3) the natural rate of increase by excess of births over deaths, (4) the age composition, (5) the "racial" composition and (6) the so-called quality, as variously appraised through what the psychologists test under the designation "intelligence" or by other criteria or combinations. The four principal attributes which can be objectively measured lead to the conclusion that the populations of the Western Hemisphere are at present in a relatively much more favorable position biologically and demographically than are those of the Eastern Hemisphere. The fundamental problem facing the populations in the Western World is what they are going to make of the future that lies before them. It needs no great prophet, Pearl emphasizes, to foresee that after the present conflict is ended enormous pressure will be exerted on the peoples of the Western Hemisphere to take immigrants from the Old World and share with them the acres that are still relatively so sparsely populated. It is equally certain, he believes, that should the gates be thrown wide open it would be a comparatively short time in terms of human history until the average population density of our hemisphere would be as great as that of the Old World today. Although this forecast, like all prophecies, is an uncertain quantity, one cannot but agree with Pearl "that the immediate establishment of national population policies soundly grounded scientifically is an imperative obligation upon the peoples of the Americas." Also it is probably safe to conclude that the relatively favorable position reflected in a population density of 16.5 persons to the square mile in the Western, as compared with 57 in the Eastern, Hemisphere plays a large part in the relative freedom from economic strife manifest between nations in the Americas.

THE STATISTICS ON SYPHILIS

Recent announcements and bulletins issued by various agencies of the federal government have quoted varying rates for the incidence of syphilis. Thus, one pamphlet states that there are 224 new cases annually for each hundred thousand of the population. A poster, however, carries the statement "A million new victims each year." In an endeavor to determine the method by which such figures were reached, a letter was addressed to the Division of Venereal Diseases of the United States Public Health Service, and the following information is supplied: The figure 224 per hundred thousand represents an annual attack rate, based on census material assembled in 1936-1937, indicating the known number of cases of syphilis of less than one year's duration in which treatment was sought from an authorized source of treatment. The second statement, namely "A million new victims each year," is a rate based on information assembled from 1927 to 1930 through surveys of authorized sources of treatment. These reports indicated that 518,000 persons with early syphilis sought medical care and an additional half million persons sought similar care for the first time, although their infections had passed the early stages of the disease. The explanation is, then, that in the lower rates only those seeking medical care for early syphilis are reported, whereas in the higher figure an additional half million persons who failed to seek treatment during the first year of the disease but did so later are included in the statement "A million new victims each year." In other words, this estimate of a million assumes that each year a half million persons contract the disease who do not seek medical care during the early stages but do so later. Would it not be wholly an assumption that there are each year a half million new cases and a half million old cases in which it is decided for the first time to seek treatment? The Division of Venereal Diseases points out that further studies are under way and it is hoped to supply more satisfactory statements on the incidence of syphilis in our times.

1. Acetylsalicylic Acid Deaths, Current Comment, J. A. M. A. **115**: 1199 (Oct. 5) 1940.

1. Pearl, Raymond: A Comparative Examination of Certain Aspects of the Populations of the New World, Human Biology **12**: 359 (Sept.) 1940.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

COMMISSIONS IN MEDICAL CORPS OF U. S. NAVY

Applications for commissions as medical officers in the U. S. Navy are now being received in the Bureau of Medicine and Surgery, Navy Department, Washington, D. C. Examinations for entrance into the Medical Corps of the regular Navy will be held on May 12 to 15, inclusive, 1941, at all of the larger naval hospitals, including those at Chelsea (Boston), Mass., Brooklyn, Philadelphia, Portsmouth (Norfolk), Va., Great Lakes, Ill., Charleston, S. C., Pensacola, Fla., San Diego, Calif., Mare Island, Calif., Puget Sound (Bremerton), Wash., and at the Naval Medical Center, Washington, D. C. Successful candidates from this examination will receive their appointments approximately two months from the date of the examination.

Applicants are required to be citizens of the United States between 21 and 32 years of age at the time of appointment; graduates of a class A medical school, and to have completed at least one year of intern training in a hospital accredited for intern training by the Council on Medical Education and Hospitals of the American Medical Association. They are required to be physically qualified and to demonstrate their professional qualifications by written, oral and practical examinations embracing the subjects of general medicine, general surgery, obstetrics and gynecology, and preventive medicine and jurisprudence. The physical and professional examinations usually require from three to four days for completion.

Successful candidates are commissioned as assistant surgeons with the rank of lieutenant (junior grade) in the Medical Corps of the Navy. An officer of this rank receives compensation of $2,699 a year if he has no dependents and $3,158 a year if he has dependents.

A "Circular for the Information of Persons Desiring to Enter the Medical Corps of the United States Navy," including data pertaining to physical requirements, promotion and retirement, may be obtained by addressing a request to the Surgeon General of the Navy, Navy Department, Washington, D. C.

PHYSICIANS WANTED FOR CCC CAMPS

Full time positions are available for physicians in the Sixth Corps Area (Illinois, Michigan and Wisconsin) for medical work in the Civilian Conservation Corps. Only graduates of class A medical schools are acceptable, and they must be licensed to practice in at least one state and must be physically qualified. Further information may be obtained from the surgeon, Sixth Corps Area, New P. O. Building, Chicago.

ARMY RESERVE OFFICERS ORDERED TO ACTIVE DUTY

WAR DEPARTMENT

The following additional medical reserve corps officers had been ordered to extended active duty with the regular army by direction of the War Department, Washington, D. C., up to Dec. 27, 1940:

AUSHERMAN, Howard Milton, 1st Lieut., Chattanooga, Tenn.
BIERNOFF, Joseph, 1st Lieut., San Francisco.
CHESTER, Benjamin Joseph, 1st Lieut., Brooklyn.
CONEN, Warren Joseph, 1st Lieut., Milwaukee.
FITZSIMMONS, William Richard, 1st Lieut., Zelienople, Pa.
FREE, Richard Mathew, Captain, Coatesville, Pa.
KANE, David Saul, 1st Lieut., Chicago.
KENDRICK, James E., Jr., 1st Lieut., Greenville, Ala.
KOLODNY, Sydney Maurice, 1st Lieut., Chicago.
KREINDLER, Louis, 1st Lieut., Cincinnati.
KYSOR, Benjamin Bennett, Jr., 1st Lieut., Madrid, N. M.
LORD, Herman McNeill, 1st Lieut., Chelsea, Mich.
MARGOLIS, Meyer Nathan, 1st Lieut., Cincinnati.
MILLER, Earl Edward, 1st Lieut., Washington, D. C.
MYERS, Martin Alexander, 1st Lieut., Philadelphia.
O'CONNELL, William Michael, 1st Lieut., Peoria, Ill.
OLSEN, Orland Stenberg, 1st Lieut., Sioux Falls, S. D.
ROTHMAN, Leonard Edward, 1st Lieut., Milwaukee.
SIRLIN, Edward Martin, 1st Lieut., Moultrie, S. C.
SOWERS, John William, 1st Lieut., Fayetteville, Pa.
SUTTON, Robert Stamper, 1st Lieut., San Antonio, Texas.
VICTOR, Samuel Allan, 1st Lieut., Omaha.
WISE, Albert Walter, 1st Lieut., Peoria, Ill.
WOLFE, Russell Sheldan, 1st Lieut., Houston, Texas.

FIRST CORPS AREA

The following additional medical reserve corps officers had been ordered to extended active duty with the regular army by the Commanding General, First Corps Area, up to Dec. 20, 1940. The First Corps Area comprises the states of Maine, Vermont, New Hampshire, Rhode Island, Massachusetts and Connecticut.

GILLESPIE, Harry, Lieut., Hartford, Conn.
NASH, William C., 1st Lieut., Beverly, Mass.
SKOOG, Allan P., 1st Lieut., Rutland, Mass.

THIRD CORPS AREA

The following additional medical reserve corps officers had been ordered to extended active duty by the Commanding General, Third Corps Area, up to Dec. 27, 1940. The Third Corps Area comprises the states of Pennsylvania, Virginia, District of Columbia and Maryland.

ADAMS, Harry Albert, 1st Lieut., Hanover, Pa., Fort George G. Meade, Md.
BALL, Myron Henry, 1st Lieut., Scranton, Pa.
BELL, Robert Franklin, 1st Lieut., Petersburg, Va., Camp Lee, Va.
BOAS, Harry, 1st Lieut., Pittsburgh.
CONFAIR, William Freas, Captain, Benton, Pa.
CORLEY, Karl Coates, 1st Lieut., Chevy Chase, Md.
CRIST, George Bruce, Major, Frederick, Md., Camp Lee, Va.
DaPARMA, Frank Louis, 1st Lieut., Pittsburgh.
DICK, Arthur, 1st Lieut., Washington, D. C.
DRISCOLL, Thomas Latane, Major, Columbia, Va.
HAYES, Merrill B., 1st Lieut., Upland, Pa.
JONES, Eugene M., 1st Lieut., North Braddock, Pa.
KANE, James Aloysius, 1st Lieut., Philadelphia, Camp Lee, Va.

KATZ, Samuel Herschel, 1st Lieut., Philadelphia.
KAUFMAN, Irwin Leonard, Captain, Pittsburgh.
MacNEAL, Herbert Pratt, 1st Lieut., Philadelphia.
MANCUSO, Joseph Arthur, 1st Lieut., Meadville, Pa.
MONTGOMERY, Edward S., 1st Lieut., Tarentum, Pa.
REED, Paul Allen, 1st Lieut., Washington, D. C.
REESE, Evan Charles, 1st Lieut., East Stroudsburg, Pa.
ROSENBERG, Seymour Joseph, Captain, Baltimore.
SANDHAUS, Julius Louis, 1st Lieut., Lancaster, Pa.
SCHLECHTER, Charles F., 1st Lieut., Philadelphia.
SCHOCHET, George, 1st Lieut., Cockeysville, Md., Fort Belvoir, Va.
SHARP, Edward George, 1st Lieut., Philadelphia.
SPEAR, Paul William, 1st Lieut., Baltimore.
UNDERWOOD, Harry Burnham, 1st Lieut., Bangor, Pa.
WITKIN, Leon Abba, 1st Lieut., Philadelphia.
ZEHFUSS, Paul Edward, Captain, Pittsburgh.

SIXTH CORPS AREA

The following additional medical reserve corps officers had been ordered to extended active duty by the Commanding General, Sixth Corps Area, up to Dec. 27, 1940. The Sixth Corps Area comprises the states of Wisconsin, Illinois and Michigan.

ANKNER, Frank J., 1st Lieut., Thief River Falls, Minn.
BALDING, Bruce Ned, 1st Lieut., Elgin, Ill.
BARAK, Herbert G., 1st Lieut., Dixon, Ill.
EPSTEIN, David, 1st Lieut., Chicago.
HUTH, Melvin F., 1st Lieut., Baraboo, Wis.
KAISER, Jerome, 1st Lieut., Chicago.
KAUFMAN, Lawrence W., 1st Lieut., Milwaukee.
KOCOVSKY, Clarence J., 1st Lieut., Wauwatosa, Wis.
KLEIN, Max E., 1st Lieut., Milwaukee.
LATIMER, Earl O., 1st Lieut., Chicago.
LEASUM, Charles R., 1st Lieut., Sturgeon Bay, Wis.
LEEB, Harry, 1st Lieut., Milwaukee.
MOLL, Clarence D., Major, Detroit.
RAINE, Forrester, Captain, Milwaukee.
ROSENTHAL, Irving H., 1st Lieut., Chicago.
ROSENTHAL, Martin J., Captain, LaSalle, Ill.
RUTHLEDGE, James H., Major, Nebo, Ill.
SCHAFFER, Bernard J., 1st Lieut., Chicago.
SCHIELE, William C., Major, Galena, Ill.
SMITH, Herschell S., 1st Lieut., East St. Louis, Ill.
STEIN, Phillip J., 1st Lieut., Chicago.
SUMMERS, Thomas F., 1st Lieut., Olney, Ill.

SEVENTH CORPS AREA

The following additional medical reserve corps officers had been ordered to extended active duty by the Commanding General, Seventh Corps Area, up to Dec. 27, 1940.

The Seventh Corps Area comprises the states of North Dakota, South Dakota, Minnesota, Nebraska, Iowa, Kansas, Missouri, Arkansas and Wyoming.

AUTRY, Daniel Hill, 1st Lieut., Rochester, Minn., Camp Joseph T. Robinson, Ark.
CULBERTSON, Robert A., Major, St. Ansgar, Iowa, Camp Joseph T. Robinson, Ark.
MORTON, William Adler, 1st Lieut., Vandalia, Mo., Fort Snelling, Minn.
PROCHAZKA, Otto Frank L., 1st Lieut., Wichita, Kan., Camp Joseph T. Robinson, Ark.
USHER, Francis Cowgill, Captain, Rochester Minn., Camp Joseph T. Robinson, Ark.

NAVAL RESERVE OFFICERS ORDERED TO ACTIVE DUTY

The following additional U. S. Navy medical reserve officers had been ordered to active duty at the stations indicated up to Dec. 21, 1940:

CLARK, Frank, B., Lieut., M. C.-V. (S.), Austell, Ga., Headquarters, Eighth Naval District.
CLASEN, Arthur C., Lieut. Comdr., M. C.-V. (G.), Kansas City, Kan., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
COLEY, Joe Henry, Lieut. (j. g.), M. C.-V. (G.), Oklahoma City, Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
COWAN, John Stephen, Lieut. (j. g.), M. C.-V. (G.), Detroit, Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
COYER, Howard Arthur, Lieut. (j. g.), M. C.-V. (G.), New Cumberland, Pa., First Marine Brigade, Fleet Marine Force, Quantico, Va.
EISENBERG, Harry, Lieut. (j. g.), M. C.-V. (G.), New York, First Marine Brigade, Fleet Marine Force, Quantico, Va.
ESTES, Sol B., Lieut., M. C.-V. (G.), Abilene, Texas, Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
FREEDMAN, Saul, Lieut., M. C.-V. (S.), New York, Navy Yard Dispensary, Navy Yard, New York.
GIDDING, Samuel S., Lieut. (j. g.), M. C.-V. (G.), Wildwood, N. J., First Marine Brigade, Fleet Marine Force, Quantico, Va.
GLENN, Herbert Ross., Lieut. (j. g.), M. C.-V. (G.), State College, Pa., First Marine Brigade, Fleet Marine Force, Quantico, Va.
GLOCKER, Rudolph K., Lieut., (j. g.) M. C.-V. (G.), Royersford, Pa., First Marine Brigade, Fleet Marine Force, Quantico, Va.
GRANET, Emil, Lieut., M. C.-V. (S.), New York, Naval Hospital, Brooklyn.
HAIGHT, Harry Hurless, Lieut. M. C.-V. (G.), Crystal Falls, Mich., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
HATCHETTE, Charles V., Lieut. Comdr., M. C.-V. (G.), Lake Charles, La., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
ISARD, Harold Joseph, Lieut. (j. g.), M. C.-V. (G.), Philadelphia, First Marine Brigade, Fleet Marine Force, Quantico, Va.
JENSEN, Russell M., Lieut. (j. g.), M. C.-V. (G.), Monmouth, Ill., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
KIENE, Richard H., Lieut. (j. g.), M. C.-V. (G.), Kansas City, Mo., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
KOEHLER, Joseph S., Lieut. Comdr., M. C.-V. (G.), Dayton, Ohio, Naval Hospital, Philadelphia.
KURTZ, Gerald I., Lieut. (j. g.), M. C.-V. (G.), Paterson, N. J., Naval Hospital, Philadelphia.
LAUTERBACH, Chester H., Lieut. (j. g.), M. C.-O., Rochester, N. Y., U. S. S. *Castor*.
LaVICTOIRE, Isaac N., Lieut., M. C.-V. (G.), Ionia, Mich., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
LUCKEY, Robert C., Lieut., M. C.-V. (G.), Wolflake, Ind., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
MARGRAVES, Ross D., Lieut. (j. g.), M. C.-V. (S.), Houston, Texas, Naval Air Station, Corpus Christi, Texas.
McGRAIL, Matthew A., Lieut., M. C.-V. (G.), Bradford, Pa., First Marine Brigade, Fleet Marine Force, Quantico, Va.
McLAUGHLIN, Robert R. M., Lieut., M. C.-V. (S.), Great Neck, N. Y., Naval Hospital, Brooklyn.
OLMSTED, George S., Lieut. (j. g.), M. C.-V. (G.), Detroit, Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
PHILLIPS, John Reed, Lieut. Comdr., M. C.-V. (G.), Michigan City, Ind., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
RANDALL, Samuel Bunker, Lieut. Comdr., M. C.-V. (G.), Santa Cruz, Calif., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
ROBINSON, Charles G., Jr., Lieut. (j. g.), M. C.-V. (G.), Memphis, Tenn., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
RYAN, Harry Edward, Lieut. (j. g.), M. C.-V. (G.), Centralia, Ill., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
SCHLOSSBACH, Theodore, Lieut., (j. g.), M. C.-V. (G.), Ocean Grove, N. J., First Marine Brigade, Fleet Marine Force, Quantico, Va.
SCHMIDT, Albert F., Lieut. (j. g.), M. C.-V. (G.), Manasquan, N. J., First Marine Brigade, Fleet Marine Force, Quantico, Va.
SCHNEIERSON, Sol S., Lieut., M. C.-V. (G.), New York, First Marine Brigade, Fleet Marine Force, Quantico, Va.
SHINN, Adam Louis, Lieut., M. C.-V. (G.), Corpus Christi, Texas, Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
SIMPSON, Frederick G., Lieut. (j. g.), M. C.-V. (G.), Wauwatosa, Wis., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
SKINNER, Robert W., Lieut. (j. g.), M. C.-V. (G.), Pittsburgh, First Marine Brigade, Fleet Marine Force, Quantico, Va.
SMITH, Stanton G., Lieut. (j. g.), M. C.-V. (G.), Decatur, Ill., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
SYBILRUD, Hjalmer W., Lieut. Comdr., M. C.-V. (G.), Bricelyn, Minn., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
THOMPSON, Ralph B., Lieut. (j. g.), M. C.-V. (G.), Lynbrook, N. Y., First Marine Brigade, Fleet Marine Force, Quantico, Va.
TRANSUE, Seward Myers, Lieut. (j. g.), M. C.-V. (G.), Glenville, Pa., First Marine Brigade, Fleet Marine Force, Quantico, Va.
VAIL, James B., Lieut., M. C.-V. (G.), Henning, Minn., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.
WHITE, Raymond Ned, Lieut. (j. g.), M. C.-V. (G.), Springfield, Mo., Second Marine Brigade, Fleet Marine Force, Marine Corps Base, San Diego, Calif.

ORGANIZATION SECTION

OFFICIAL NOTES

THE CLEVELAND SESSION

Applications for Space in the Scientific Exhibit

Applications for space in the Scientific Exhibit at the Cleveland Session, both for exhibits and for motion pictures, close on January 20. Blanks may be obtained from the section representatives or from the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago.

RADIO BROADCASTS

"Doctors at Work" is the title of the sixth annual series of dramatized radio programs being presented by the American Medical Association and the National Broadcasting Company.

The series opened Wednesday, Nov. 13, 1940, and will run for thirty consecutive weeks, closing with a broadcast from the A. M. A. meeting at Cleveland on June 4. The program is scheduled for 10:30 p. m. eastern standard time (9:30 central, 8:30 mountain, 7:30 Pacific time) over the Blue network, other N. B. C. stations and Canadian stations.

The programs are broadcast on what is known in radio as a sustaining basis; that is, the time is furnished gratis by the radio network and local stations, and no revenue is derived from the programs. Therefore, local stations may or may not take the programs, at their discretion, except those stations which are owned and operated by the National Broadcasting Company.

Some radio stations may be unable to broadcast the program at the regular scheduled time and may transcribe and broadcast it at another hour or even on another day. It is advisable therefore to verify the time by reference to local newspapers or by telephoning the local Blue network stations.

The programs will dramatize what modern medicine offers the individual in the way of opportunities for better health and the more successful treatment of disease. Incidental to this main theme, the programs will explain the characteristics of the different fields of modern medicine and its specialties.

Descriptive posters for local distribution may be had gratis from the Bureau of Health Education, American Medical Association, 535 North Dearborn Street, Chicago. Program titles will be announced weekly in THE JOURNAL and monthly in *Hygeia*, the Health Magazine.

Tickets are available for each broadcast. Address the Bureau of Health Education, American Medical Association, 535 North Dearborn Street, Chicago. Tickets are free, but a stamped self-addressed envelop should accompany requests.

The next three programs to be broadcast, together with their dates and their titles, are as follows:

January 15. Best Foot Forward.
January 22. Blocking Pain.
January 29. Deeper Than It Looks.

WOMAN'S AUXILIARY

Illinois

The woman's auxiliary of the Irving Park Branch of the Chicago Medical Society, of which Mrs. Charles Stigman is president, met October 22 at the Spaulding School for Crippled Children. A tour of the institution was made. September 24 it met at the Irving Park Y. M. C. A. The Calumet branch, of which Mrs. John Soukup is president, met September 27 at the home of Mrs. J. O. Peterson. The South Chicago branch, of which Mrs. William Murray Jr. is president, met October 7 at South Shore Hospital Nurses' Home. At a benefit bridge party money was raised to be used for *Hygeia*. The North Shore branch, of which Mrs. C. I. Wynekoop is president, met October 7 at the home of Mrs. Walter Armstrong. Mrs. Barnett Smith presented some Scandinavian readings of her own composition. The Jackson Park Branch, of which Mrs. Raymond McPherron is president, met October 16 at the home of Mrs. H. P. Jenkins. Dr. Charles E. Shannon, president of the Jackson Park Branch of the Chicago Medical Society, spoke on "The Relationship Between the Branch and the Woman's Auxiliary." The North Side branch, with Mrs. A. I. Edison as president, met October 21 at the Chicago Historical Society. One hundred and five members and guests were present. Mrs. Edison gave a fine talk on the "Aims and Objectives of the Auxiliary." "Choose to Live," a moving picture sponsored by the American Society for the Control of Cancer, was shown. Mr. J. M. Pratt, executive administrator of the National Physicians' Committee, spoke on "Medical Progress." Dr. Franklin C. Bing, Secretary of the Council on Foods, spoke on "Nutrition in Relation to the National Defense." The Aux Plaines branch, with Mrs. C. W. Stuart as president, met October 25 at the home of Mrs. H. A. Sofield. Mr. F. J. Schlotfelt of the U. S. Department of Justice, spoke on immigration and naturalization. Mrs. H. J. Dooley discussed the "Benevolence Fund" and the part the auxiliary will take.

The Peoria County auxiliary, of which Mrs. O. E. Barbour is president, met October 8 at the Creve Coeur Club. Mrs. Walter King, philanthropic chairman, announced that the auxiliary would help at the Red Cross headquarters every Tuesday afternoon. The group then joined the doctors at the Jefferson Hotel where Dr. Horton Casparis, Nashville, Tenn., gave a talk on "Mental Hygiene." A number of school teachers and principals of Peoria were invited to attend. A question and answer period followed.

The Bureau County auxiliary, with Mrs. A. R. Troupa as president, met October 10 at the Presbyterian Church. The Bureau County Medical Society and the County Lawyers and their wives were guests of the auxiliary. Dr. Paul Schroeder, state criminologist, spoke on "Prevention and Cure of Juvenile Delinquency."

The Will-Grundy County auxiliary, with Mrs. George H. Woodruff as president, met October 14 at the home of Mrs. B. S. Wilcox. Mr. Stuart Hummel, superintendent of Silver Cross Hospital, spoke on "The Hospital and Its Part in National Preparedness."

Southern Medical Auxiliary

The Woman's Auxiliary to the Southern Medical Association met in Louisville, Ky., Nov. 13-14, 1940, during the meeting of the Southern Medical Association. The program included an address by the national auxiliary president, Mrs. V. E. Holcombe, on "Enlarging the Circulation of the Bulletin." Dr. Nathan Van Etten, President of the American Medical Association, gave an inspiring talk on "Socialized Medicine." The Kentucky organization presented a "Pageant of Pioneer Kentucky." The members of the auxiliary were guests of the Woman's Club at tea to hear Dr. Thomas Parran, chief of the United States Health Service. The new president, Mrs. M. Pinson Neal, was installed for the coming year.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Personal. — Dr. William J. Kerr, professor of medicine, University of California Medical School, San Francisco, has been elected an honorary member of the Liga Argentina contra el Reumatismo, Buenos Aires.——Dr. Henry E. Dahleen has been appointed superintendent of the Santa Clara County Hospital, San Jose, succeeding the late Dr. Fred S. Ryan. The latter had held the superintendency since the resignation of Dr. Doxey R. Wilson last summer.——Dr. Charles E. Schoff, Sacramento, has resigned as a member of the state board of health on account of ill health, it was stated.

COLORADO

Society News.—Dr. Oswald S. Lowsley, New York, discussed "Prostatic Surgery" at a recent meeting of the Medical Society of the City and County of Denver, and Dr. Edgar Mayer, New York, "Pulmonary Tuberculosis in the Present Epidemiologic Phase."——The Colorado Neurological Society was addressed in Denver, December 7, among others, by Drs. Karl T. Neubuerger on "Pathogenesis of Intracranial Hemorrhage," and Charles A. Rymer, "Review of Shock Therapy to Date." Dr. Franklin G. Ebaugh gave a demonstration of electric shock therapy.

DELAWARE

Hospital Seminar.—The Delaware State Hospital, Farnhurst, conducted a seminar, November 24-26 and December 2-5, with the following speakers:

Dr. Bernard J. Alpers, Philadelphia, Neuropathology.
Dr. George Hall Hyslop, New York, Clinical Neurology.
Dr. William P. Murphy, Boston, Internal Medicine.
Dr. Francis C. Grant, Philadelphia, Neurosurgery.
Dr. Edward A. Strecker, Philadelphia, Psychiatry.
Dr. Charles W. Dunn, Philadelphia, Endocrinology.

GEORGIA

Course for General Practitioners.—A series of courses on venereal diseases opened at the University of Georgia School of Medicine, Augusta, November 18-30. The second was held December 2-14 and the third was to be January 6 to 18. The series is sponsored by the state department of public health in cooperation with the U. S. Public Health Service and the board of regents of the University System.

IDAHO

Society News.—Dr. Nymphus F. Hicken, Salt Lake City, discussed "Thyrogenic Disturbances" before a meeting of the Southwestern Idaho District Medical Society in Boise recently. ——Drs. Donald A. Palmer and Arthur E. Lien, Spokane, discussed medical and surgical complications, respectively, of pneumonia at a recent meeting of the North Idaho Medical Society in Lewiston.

LOUISIANA

Personal. — Dr. De Witt T. Milam, Monroe, has been appointed superintendent of the E. A. Conway Charity Hospital. According to the state medical journal, Dr. Milam will be honorary superintendent until the hospital is opened in a few months. He is president of the Ouachita Parish Medical Society, secretary of the Louisiana State Urological Society and is regimental surgeon of the 156th Infantry.

The Chaillé Oration.—Dr. Frederick P. Moersch of the Mayo Clinic, Rochester, Minn., delivered the annual Chaillé Oration of the Orleans Parish Medical Society, December 3, in New Orleans. His subject was the shock treatment of major psychoses by electricity. The lecture is named for Dr. Stanford Emerson Chaillé, who died in 1911. Dr. Chaillé was once dean of the medical school now known as Tulane University of Louisiana School of Medicine, New Orleans, and in 1879 was president of an early Habana yellow fever commission.

MARYLAND

Society News.—The Baltimore City Medical Society held its annual meeting December 6 with the following speakers: Drs. Max M. Strumia, Bryn Mawr, Pa., on "Plasma, Preparation, Means of Preservation, with Special Reference to the Treatment of Shock," and John Scudder, New York, "Shock: Blood Studies as a Guide to Therapy." A symposium on diseases of the liver was presented before the society December 20 by Drs. Thomas P. Sprunt, William Halsey Barker and Moses Paulson.

Dr. Blalock Succeeds Dr. Dean Lewis at Johns Hopkins.—Dr. Alfred Blalock, professor of surgery, Vanderbilt University School of Medicine and visiting surgeon at Vanderbilt Hospital, Nashville, Tenn., has been appointed to a similar position at Johns Hopkins University School of Medicine and surgeon in chief to the Johns Hopkins Hospital, Baltimore. The professorship has been vacant since the retirement of Dr. Dean Lewis in the spring of 1939. A native of Culloden, Ga., Dr. Blalock graduated at Johns Hopkins in 1922. He was a member of the staff of the Johns Hopkins Hospital from 1922 to 1925 and resident surgeon at Vanderbilt Hospital from 1925 to 1927. He served as assistant professor of surgery at Vanderbilt from 1927 to 1930 and associate professor from 1930 to 1937, when he became professor. He is 41 years of age.

MASSACHUSETTS

Obstetric Meeting.—The New England Obstetrical and Gynecological Society held its twelfth annual meeting in Boston, December 4. The speakers included:

Robert Kark, B. A., and Dr. Alexander W. Souter, Preoperative and Postoperative Use of Vitamin K (original work).
Dr. Maurice O. Belson, Uterine Hemorrhage—Technic of Vaginal Packing.
Dr. Roy J. Heffernan, Myomectomy During Pregnancy—A Report of Four Cases.
Dr. William C. Moloney, Erythroblastosis Foetalis.
Dr. Louis E. Phaneuf, Use of Pessaries.

New Dean at Boston University.—Dr. Bennett F. Avery, associate professor of anatomy, American University of Beirut, Beirut, Syria, has been appointed dean of Boston University School of Medicine, Boston, succeeding the late Dr. Alexander S. Begg. Dr. Avery graduated at the University of Michigan Medical School, Ann Arbor, in 1925, serving as a Rockefeller Foundation fellow in the department of anatomy the following year. He was adjunct professor of anatomy at the University of Beirut from 1926 to 1929 and has been associate professor since 1930. During the year 1929-1930 he was a Rockefeller Foundation fellow at the University of Chicago. He served for a time as acting dean in Beirut. Dr. Avery was to take up his new work January 1.

MICHIGAN

Society News.—Dr. Harther L. Keim, Detroit, discussed treatment of the more common dermatoses before the Jackson County Medical Society, Jackson, November 20.——Dr. Soma Weiss, Boston, lectured before the Wayne County Medical Society, Detroit, December 9, on "Types of Bright's Disease and Their Management."

Hospital Day.—The Woman's Hospital, Detroit, observed "Hospital Day," November 13, with the following program:

Dr. Catharine MacFarlane, Philadelphia, Report of an Experiment in the Control of Cancer of the Uterus.
Dr. Arlie R. Barnes, Rochester, Minn., Significant Objectives in the Treatment of Congestive Heart Failure.
Dr. Harry M. Kirschbaum, Detroit, Demonstration of Electrostethophone.
Dr. Everett D. Plass, Iowa City, Hypertension in Obstetric Patients.
Dr. Donald W. Gordon Murray, Toronto, Use of Heparin in Thrombosis, Embolism and Blood Vessel Surgery.

S. L. A. Marshall, Detroit, addressed the dinner session on "Can America Stay Out of the War?"

Plans for Medical Center in Detroit.—With the selection of a site, plans for the proposed $100,000,000 medical center have definitely taken shape, it is announced. Fourteen and one half acres, privately owned, have been acquired for the center, which is to include sixteen buildings when completed. It is estimated that construction will take five years, but present plans call for the completion of one unit of the hospital and the medical science building by next fall. The entire project will be owned by the Detroit Board of Education. A group of Detroit physicians has already raised eight million dollars of the total.

MINNESOTA

Conference on Preparedness and Defense.—The American Legion Conference on Preparedness and Defense Through Health Education, Physical Education and Recreation was held at St. Paul, December 21. Frank McCormick, director of athletics, University of Minnesota, opened the meeting discussing "The Purpose of the Conference and the Interest of

the American Legion in the Movement." Other speakers included:

Dr. Morris Fishbein, Chicago, Editor of THE JOURNAL, Health and National Defense.
Mr. V. K. Brown, director of recreation, Chicago Park District, Recreation and National Defense.
Carl L. Nordly, University of Minnesota, Physical Education and National Defense.
V. D. Irwin, D.D.S., dental health director, Minnesota Department of Health, Dental Health and National Defense.
Mr. G. Cullen Thomas, General Mills, Minneapolis, The Food Processor.

Governor Harold E. Stassen addressed the meeting.

MISSISSIPPI

Changes in Health Officers.—Dr. James M. Campbell, Morton, has been appointed health officer of Marion County. ——Dr. Arthur P. Vandergrift Jr., formerly of Jackson, has been named director of the De Soto County health unit, succeeding Dr. John W. Evans Jr., Hernando; the latter left to take postgraduate work at Washington University School of Medicine, St. Louis.

Society News.—The Clarksdale and Six Counties Medical Society was addressed in Clarksdale recently by Drs. Wesley J. C. Wiemers on "Phrenic Nerve Operations"; Ray H. Biggs, "Pneumothorax Therapy"; Allen A. Lilienthal, "Extrapleural Pneumothorax"; John S. Harter, "Thoracoplasties and Other Operations," and Henry Boswell, "The Significance of the Collapse Therapy Program at the Mississippi State Sanatorium." All are from Sanatorium.——Dr. Leon H. Brevard, Deeson, discussed "Nutrition and Resistance to Disease in Everyday Practice" before the Coahoma County Medical Society and the Clarksdale Hospital medical staff recently.

MISSOURI

The Hodgen Lecture. — Dr. Claude S. Beck, associate professor of surgery, Western Reserve University School of Medicine, Cleveland, will present the annual Hodgen Lecture before the St. Louis Medical Society, January 14, under the auspices of the St. Louis Surgical Society and the Medical Fund Society. His subject will be "Surgery of the Heart."

Society News.—A symposium on the present status of bacterial chemotherapy in pediatrics was presented before the St. Louis Medical Society, December 10, by Drs. Charles R. Anderson, Henry L. Barnett and Alexis F. Hartmann and Anne M. Perley, M.A. John Elliott, Sc.D., Salisbury, N. C., discussed "Indications for and the Use of Blood Plasma as a Substitute for Whole Blood" before the society, December 3. ——The Kansas City Surgical Society was addressed, November 20, among others, by Drs. Eugene O. Parsons and Nelse F. Ockerblad on "Congenital Absence of Diaphragm" and "Tumor of the Adrenal Gland," respectively.——Dr. Lealdes M. Eaton, Rochester, Minn., discussed "Clinical and Experimental Studies on Spinal Fluid Headaches and Root Pains," November 20, before the Missouri-Kansas Neuropsychiatric Society, Kansas City.——Enrique E. Ecker, Ph.D., Cleveland, read a paper before the Jackson County Medical Society in Kansas City, December 20, on "Recent Progress in Immunity." ——Dr. Maurice H. Seevers, Madison, Wis., will present a "Review on Anesthesia with Late Advances" before the Kansas City Academy of Medicine, January 17.

NEW JERSEY

Discussion of Mental Deficiency.—An institute was held at the North Jersey Training School, Little Falls, December 16, with a panel discussion on "Medical Aspects of Mental Deficiency" as a feature. Members of the panel were Drs. Edward J. Humphreys, Thiells, N. Y.; Ellen C. Potter of the state department of institutions and agencies, Trenton; Georges H. Lussier, Marlboro; Elizabeth Nesbitt, Totowa, and James Q. Atkinson, New Lisbon.

Society News.—Dr. Oliver L. Stringfield, Stamford, Conn., addressed the Essex County Medical Society, Newark, December 12, on "Factors Affecting Mortality Rates Among Premature Infants" and Dr. Leroy A. Wilkes, Trenton, executive officer of the Medical Society of New Jersey, discussed the functions of his office. —— Dr. Douglas Quick, New York, addressed the Academy of Medicine of Northern New Jersey, December 19, on "Cancer of the Mouth."——Dr. Herbert T. Kelly, Philadelphia, addressed the Burlington County Medical Society, Moorestown, recently on vitamin deficiency disease with special reference to vitamin therapy.——Dr. Willits P. Haines, Ocean City, addressed the Medical Society of Cape May County, Cape May Court House, December 10, on medical preparedness. —— Dr. Martin E. Rehfuss, Philadelphia, discussed "Gallbladder Disease and the General Practitioner" before the Camden County Medical Society, Camden, December 3.——Dr. Elliott P. Joslin, Boston, addressed the Hudson County Medical Society, Jersey City, December 3, on "The Renaissance of the Treatment of Diabetes."——Dr. Henry C. Falk, New York, discussed "Office Gynecology" at a meeting of the Bergen County Medical Society in Teaneck, December 10.

NEW YORK

Eastman Memorial Lecture. — Dr. Herbert C. Clark, director of the Gorgas Memorial Laboratory, Panama, gave the Eastman Memorial Lecture at the University of Rochester School of Medicine and Dentistry, December 16. Dr. Clark's subject was "Modern Problems in the Control and Spread of Tropical Diseases."

Dinner in Honor of State President. — The Medical Society of the County of Monroe gave a dinner December 17 in Rochester in honor of Dr. James M. Flynn, Rochester, who is president of the Medical Society of the State of New York. Dr. Nathan B. Van Etten, New York, President of the American Medical Association, gave an address on "Medical Futures."

Society News. — Dr. Henry Jackson King, Binghamton, addressed the Broome County Medical Society, Binghamton, November 12, on "Treatment of Acute Appendicitis Complicated by Peritonitis—a Six Year Survey of Appendicitis."—— Alexander O. Gettler, Ph.D., chief toxicologist of the medical examiner's office, New York, addressed the Ulster County Medical Society and the county bar association, Kingston, in October on "Chemistry in the Detection of Crime."——Dr. Frederick A. Coller, Ann Arbor, Mich., addressed the Medical Society of the County of Albany, November 27, on "Parenteral Feeding."

Personal.—Dr. Robert C. Woodman has retired as superintendent of Middletown State Homeopathic Hospital, Middletown.——Dr. August E. Witzel, Brooklyn, has been appointed superintendent of the Newark State School, succeeding Dr. Hiram G. Hubbell, who has been acting superintendent since the death of Dr. Charles L. Vaux. Dr. Hubbell returns to his former position as clinical director.——William D. Coolidge, Ph.D., director of the General Electric Research Laboratory at Schenectady, has been appointed a vice president of the General Electric Company. He will continue as director of research.

New York City

Medical College News. — George W. Bachman, Ph.D., director of the School of Tropical Medicine of the University of Puerto Rico, under the auspices of Columbia University, addressed the staff and students of Long Island College of Medicine, December 18, on "Tropical Medicine: Its Historical Background and Its Importance in National Defense."

New Medical Facilities for Steamship Line.—A new eight room medical unit was opened by the Grace Line in November to care for its 2,000 seagoing and shore workers. The unit has a medical examination division, where each employee is examined prior to employment and periodically thereafter, and a first aid and dispensary division. Dr. William G. Terwilliger is medical director of the line. The staff includes two assistant physicians, five ship surgeons who serve on the vessels of the line, five ship nurses and three trained attendants.

Personal.—Alexander O. Gettler, Ph.D., received a Townsend Harris Medal at the sixtieth annual dinner of the Associated Alumni of the College of the City of New York, November 6. Dr. Gettler, professor of toxicology at New York University College of Medicine and city toxicologist, was cited as a "lecturer before learned societies, prolific writer in highly specialized fields of chemistry, shrewd investigator of the evidences of crime, and thereby an important helper and abettor of the work of those agencies of the city government devoted to the preservation of the public safety." An alumni service medal was awarded to Dr. Martin W. Ware, cited as "volunteer surgeon to the athletes of C. C. N. Y." for more than a decade.

Museum of Health Has Permanent Home.—The American Museum of Health, incorporated in 1937, will be permanently installed in the building formerly occupied by the Masterpieces of Art exhibit during the World's Fair, according to an agreement signed December 5 by Park Commissioner Robert Moses and Louis I. Dublin, Ph.D., chairman of the board of directors of the museum. The popular museum

devoted to medicine and public health will form an important unit in the civic, educational and recreational center being developed on the site of the fair. Its operation will be financed through public subscription of funds and through memberships, it was said. The American Museum of Health managed and operated the Medicine and Public Health Building at the World's Fair, which was visited by 11,800,000 persons during the two years. Many of the important exhibits from the Medicine and Public Health Building will form part of the museum's collection and many new exhibits are being created for it. Since its incorporation the museum has received financial support from the Carnegie Corporation of New York, the Josiah Macy Jr. Foundation, the Rockefeller Foundation, the John B. Pierce Foundation, nine large insurance companies and a number of pharmaceutical firms. Mr. George McAneny is president of the museum; Mr. Frederick Osborn, vice president, and Mr. Sam A. Lewisohn, treasurer. The directors include Mayor La Guardia, George E. Vincent, Ph.D., Dr. Dublin, Mr. James Marshall and Drs. John L. Rice, health commissioner, George Baehr, David J. Kaliski, Victor G. Heiser, Seth M. Milliken and Malcolm Goodridge. Homer N. Calver is director of the museum.

Society News.—A symposium on "Cancer of the Gastrointestinal Tract" was presented at the first fall meeting of the International Spanish Speaking Association of Physicians, November 15, by Drs. Charles W. Mayo, Rochester, Minn.; Lester M. Morrison, Philadelphia, and Francis Carter Wood and Maurice Lenz. New branches of this society have recently been established in Los Angeles, New Orleans, Hollywood and San Antonio and in Skagway, Alaska.——A meeting of the New York Diabetes Association was held at the New York Academy of Medicine, December 13. Drs. Henry H. Faxon, Boston, and Frederick W. Williams discussed surgical and medical aspects, respectively, of "Infection and Gangrene in the Lower Extremity in Diabetes." There were also reports from St. Luke's, New York, Roosevelt and Lenox Hill hospitals.——At a scientific session of the committee on cardiac clinics of the New York Heart Association, November 26, papers were presented by Drs. Willis Fiske Evans on "Peripheral Blood Flow in Hyperthyroidism" and Arthur C. DeGraff, "Present Status of Treatment of Subacute Bacterial Endocarditis."——Kenneth N. Ogle, Ph.D., Hanover, N. H., and Dr. Sidney L. Olsho, Philadelphia, among others, addressed the New York Society for Clinical Ophthalmology, December 2, on "Induced Size Effect and Its Measurement" and "Prescriptions for Cataract and Other Strong Lenses" respectively.——A symposium on "Newer Knowledge of Liver Disease" was presented at the stated meeting of the New York Academy of Medicine, December 5, by Drs. Isidor S. Ravdin, Philadelphia; Alexander B. Gutman and Franklin M. Hanger Jr.——A symposium on chemotherapy formed the program of the Harlem Medical Association, December 4. The speakers were Drs. Harold T. Hyman, Wheelan D. Sutliff, Rupert Franklin Carter, Emanuel Appelbaum, Jacob L. Maybaum and J. Sydney Ritter.——Speakers at a meeting of the New York Physical Therapy Society, December 4, were Dr. Paul H. Hoch, on "Electric Shock Therapy in Mental Disorders," and Josephine L. Rathbone, Ph.D., on (*a*) "The Need of Learning Relaxation: Description of Certain Cases Recently Referred" and (*b*) "Items Discovered by Draft Board Physicians: A Challenge to Physical Medicine and Physical Education."

NORTH CAROLINA

District Meeting.—Dr. Frederic M. Hanes, Durham, was the guest speaker at the annual meeting of the Seventh District Medical Society, November 20. An afternoon session was held in Kannapolis, with a clinic conducted by Dr. Hanes and addresses by Drs. Thomas C. Bost, Charlotte, on "Gunshot Wounds of the Pregnant Uterus"; Abner M. Cornwell, Lincolnton, "Traumatic Injuries of War and Peace"; Andrew Blair, Charlotte, "Nephrosis," and John Elliott, Sc.D., Salisbury, "Blood Plasma in the Treatment of the Sick Child." Following a banquet at the Hotel Concord in Concord, Dr. Hanes spoke on "Modern Concepts of Vitamin Therapy."

NORTH DAKOTA

New Head of Preventable Diseases.—Dr. Frank J. Hill, director of the Mason-Manistee-Benzie Health Department, Manistee, Mich., has been appointed director of the bureau of preventable diseases in the state department of health, according to the *Journal of the Michigan State Medical Society*

OHIO

University of Cincinnati News.—The Committee on Research in Dementia Praecox organized by the Scottish Rite Masons renewed its grant of $1,000 to the University of Cincinnati College of Medicine for the second year and increased it by $500, the college recently reported. The following promotions in the medical faculty were announced: Dr. Alphonse R. Vonderahe to associate professor of anatomy; Drs. John H. Skavlem and Leon Schiff, associate professors of medicine.

Dr. Lavan Returns to Toledo.—Dr. John L. Lavan, Grand Rapids, Mich., who was health commissioner of Toledo for four years before going to Michigan, has returned to Toledo to become director of a new public health district. Dr. Lavan left Toledo to be health officer of Kalamazoo, Mich., in 1932 and went to Grand Rapids as city health officer in 1935. He graduated from the University of Michigan Medical School in 1914. In 1939 Dr. Lavan was made secretary of the newly reorganized advisory council to the state department of health.

Personal.—Dr. Derrick T. Vail Jr., professor of ophthalmology, University of Cincinnati College of Medicine, Cincinnati, was recently appointed editor of the *American Journal of Ophthalmology.* He succeeds Dr. Lawrence T. Post, St. Louis, who resigned after having been editor since 1931.—— Dr. Lloyd H. Gaston, director of the Sanilac County Health Department, Sandusky, Mich., has been named director of local health services in the Ohio Department of Health, according to the *Journal of the Michigan State Medical Society.*—— Dr. Herman J. Nimitz has been named director of the Cincinnati Anti-Tuberculosis League to succeed the late Dr. Ray G. DeVoist.

Society News.—Dr. Samuel C. Harvey, New Haven, Conn., addressed the Academy of Medicine of Cleveland, December 20, on "Diet in Relation to Wound Healing."—— Dr. Walter Estell Lee, Philadelphia, addressed the Summit County Medical Society, Akron, December 3, on "Systemic and Visceral Changes in Severe Burns."——Dr. Howard E. Boucher, Columbus, state selective service medical officer, addressed the Mahoning County Medical Society, Youngstown, December 17, on "Problems of the Examining Physician."—— Dr. William D. Collier, Youngstown, addressed the Columbiana County Medical Society in Lisbon, December 10, on "Endocrine Pathology and Physiology—Emphasis on Practical Application."

PENNSYLVANIA

Society News.—Drs. John R. Simpson and Lucien A. Gregg, both of Pittsburgh, addressed the Westmoreland County Medical Society, Greensburg, December 17, on "Common Diseases of the Upper Respiratory Tract" and "Therapeutic and Dietary Management of the Pneumonia Patient" respectively.

Philadelphia

Lecture by Professor Dam.—Prof. Henrik Dam of the Biochemical Institute of the University of Copenhagen, Denmark, will give a lecture before the Philadelphia Academy of Surgery, January 13, on "Vitamin K, Its Role in Human Pathology and Its Application to Therapeutics."

"Cyclotron Night."—The meeting of the Philadelphia County Medical Society, January 15, will be devoted to study of the cyclotron, with Dr. John H. Lawrence, assistant professor of medicine, University of California Medical School, San Francisco, and Gaylord P. Hornwell, University of Pennsylvania, as the speakers, on "How the Products of the Cyclotron Are Applied in Medical Problems" and "How the Cyclotron Works" respectively.

Pittsburgh

Society News.—At the first fall meeting of the Pittsburgh Surgical Society, November 22, the speakers were Drs. Henry T. Price, on "The Acute Abdomen in Children"; Holland H. Donaldson, "Diagnosis of Acute Surgical Lesions of the Abdomen in Childhood," and Herbert Frankenstein, "Fat Embolism Following Trauma."——Speakers at a meeting of the Allegheny County Medical Society, December 17, were Drs. Andrew P. D'Zmura, on "Nondisabling Heart Conditions"; Joseph W. McMeans, "Anatomical Evaluation of the Symptoms of Syphilis of the Aorta"; Thomas Evans Jr., "Atypical Symptomatology in Ectopic Pregnancy," and John D. Singley, two papers, "Value of the Omentum in Abdominal Surgery, with Special Reference to the Free Omental Graft," and "Treatment of Operative Abdominal Incisions Without Dressings, with Results."

SOUTH CAROLINA

Founders' Day at Medical College.—The Medical College of South Carolina, Charleston, celebrated its annual Founders' Day November 7. Clinics were held at Roper Hospital during the day and there was a banquet in the evening at the Fort Sumter Hotel with Dr. Louis Hamman, Baltimore, as the chief speaker on "Coronary Thrombosis."

Officers Elected to Succeed Dr. Hines.—Dr. Julian P. Price, Florence, was elected secretary and treasurer of the South Carolina Medical Association at a meeting of the council in Columbia, December 3, to succeed Dr. Edgar A. Hines, Seneca, who died November 27. Dr. Joseph I. Waring, Charleston, was elected editor of the state medical journal; Dr. William L. Pressly, Due West, state chairman for medical preparedness, and Dr. Thomas A. Pitts, Columbia, member of the House of Delegates of the American Medical Association, it is reported.

TENNESSEE

Society News.—Dr. Eugene M. Regen, Nashville, addressed the Davidson County Medical Society, Nashville, December 10, on "Fractures and Fracture Dislocations of the Spine." ——Drs. Raphael Eustace Semmes and Robert Lyle Motley, Memphis, addressed the Madison County Medical Society, Jackson, November 5, on "Low Back Pain and Sciatica" and "Differential Diagnosis and Treatment of Angina Pectoris and Coronary Occlusion" respectively.

State Health Meetings.—Dr. Lloyd M. Graves, Memphis, was named president-elect of the Tennessee Public Health Association at its annual conference in Nashville, October 14-16, and Dr. John J. Lentz, Nashville, became president. Dr. Robert H. Hutcheson, Nashville, was reelected secretary. ——Dr. Horton R. Casparis, Nashville, was reelected president of the Tennessee Tuberculosis Association at its annual meeting in Nashville in October. Dr. Stanford M. Herron, Jackson, is secretary and J. P. Kranz, Nashville, is executive secretary.

TEXAS

Postgraduate Assembly.—The Taylor-Jones County Medical Society sponsored the West Texas Postgraduate Assembly in Abilene December 20 with Drs. George R. Herrmann, Galveston, and Edward William Alton Ochsner, New Orleans, as the guest speakers. Dr. Herrmann discussed procedure and methods in heart examinations; pyonephrosis, hypertension and convulsions; primary anemia, and sudden cardiovascular disturbances, recognition and management. Dr. Ochsner's subjects were peptic ulcer, intestinal obstruction, lung abscess, thrombophlebitis and phlebothrombitis. Dr. Neil D. Buie, Marlin, president-elect of the Texas State Medical Association, was the speaker at a banquet in the evening.

VERMONT

Personal.—Dr. W. Scott Nay, Underhill, secretary of the state board of medical registration for thirty-six years, was honored with a community reception on his ninetieth birthday, December 12.——Dr. Horace G. Ripley, superintendent and physician in chief at Brattleboro Retreat, Brattleboro, has resigned, it is reported.

VIRGINIA

University News.—The University of Virginia Department of Medicine in cooperation with the extension division presented the twenty-sixth Postgraduate Clinic recently, a symposium on obstetrics and gynecology. Among the speakers were Drs. Henry H. Hazen, U. S. Public Health Service, Washington, D. C., on "Syphilis in Pregnancy"; James R. McCord, Atlanta, Ga., "Puerperal Infections"; Herbert F. Traut, New York, "Pyelitis in Pregnancy," and Maurice B. Strauss, Boston, "Anemias of Pregnancy." Dr. Robert D. Mussey, Rochester, Minn., gave the James Carroll Flippin Lecture on "The Toxemias of Pregnancy."

Changes in Public Health Personnel.—Dr. Walter Brownley Foster, head of the Richmond department of public welfare for sixteen years, has been appointed to the staff of the state department of health.——A new health district consisting of Isle of Wight, Nansemond, Norfolk and Princess Anne counties has been formed with Dr. John C. Neale Jr., Abingdon, in charge and headquarters at Norfolk. Dr. Neale was succeeded by Dr. Harold M. Kelso as director of the Southwest district with headquarters at Abingdon, and Dr. Allen W. Lane, Lawrenceville, has been appointed health officer of Pulaski County to succeed Dr. Kelso. Dr. Thomas F. McGough Jr., recently assistant health officer of Pulaski County in Pulaski, has been transferred to Northampton County with headquarters in Eastville to replace Dr. William Y. Garrett, who will take a course at the Johns Hopkins School of Hygiene and Public Health, Baltimore.

WASHINGTON

Seminar at Seattle Hospital.—Dr. Frank L. Horsfall Jr., New York, conducted a seminar in internal medicine at the Seattle General Hospital, December 26-28. The subjects of his lectures were virus diseases, virus pneumonias, specific therapy, influenza, bacterial pneumonias and specific prophylaxis. Dr. Horsfall addressed a special meeting of the King County Medical Society, December 26, on "Chemotherapy" and gave an address at the hospital staff dinner, December 27, on "The Periphery of Medical Research."

PHILIPPINE ISLANDS

Society News.—At a meeting of the Manila Medical Society, September 10, the speakers included Drs. Jesus Pempengco and Natalio Santiago, Caloocan, on "Pregnancy and Collapse Therapy in Pulmonary Tuberculosis: Observations on 108 Cases"; Carmelo P. Jacinto and Manuel T. Laboz, Caloocan, "Clinicoroentgenographic Recognition of Massive Pulmonary Atelectasis."

PUERTO RICO

Society News.—Dr. Eugene L. Opie, New York, addressed a meeting of the Medical Association of San Juan and the Society of Tuberculosis Physicians of Puerto Rico, November 16-17, on "Frequency and Spread of Tuberculosis" and "Infection and Reinfection with Tuberculosis." The tuberculosis society conferred a medal on Dr. Opie for "distinguished services in the field."

Hospital News.—Admiral William D. Leahy, governor of Puerto Rico, laid the cornerstone, November 16, for an addition to the Preventorium for Tuberculous Children at Guaynabo. Speakers at the ceremony, in addition to Admiral Leahy, were Drs. Ezequiel Martinez-Rivera, Oscar G. Costa-Mandry, Eduardo Garrido Morales, Jacobo Simonet, San Juan, Eugene L. Opie, New York, and Mr. Rupert Emerson, director of the division of territories and island possessions of the U. S. Department of the Interior.

Venereal Disease Control Intensified.—The Puerto Rico Department of Health has intensified its program for the control of venereal diseases, especially gonorrhea, to meet problems resulting from increased concentration of military forces. More clinics have been opened and some clinic sessions are being reserved for attention to the control of gonorrhea in towns near which military forces are stationed. An efficient system of case reporting has been put into practice and diagnostic laboratory services are available without charge to all physicians. In addition, free drugs will be provided on request to all clinics and physicians, according to a report in the *Puerto Rico Health Bulletin.* Follow-up workers are to be provided to locate and return to treatment all patients who lapse from treatment before they are cured.

GENERAL

Days of Observances.—The fifth annual Social Hygiene Day has been set for February 5 by the American Social Hygiene Association. Emphasis in the 1941 observance will be on national defense.——The National Child Labor Committee announces that the annual Child Labor Day will be observed during the week-end of January 25-27.

Van Meter Prize Competition.—The American Association for the Study of Goiter again offers the Van Meter Prize Award of $300 and two honorable mentions for the best essays submitted concerning original work on problems related to the thyroid gland. The essays may cover either clinical or research investigations, should not exceed 3,000 words in length, must be presented in English and a typewritten double spaced copy must be sent to the corresponding secretary of the association, Dr. W. Blair Mosser, 133 Biddle Street, Kane, Pa. The award will be made at the annual meeting in Boston, May 26-28, and a place reserved on the program for the author if it is possible for him to attend. The essay will be published in the annual proceedings of the association, but this will not prevent its further publication in any journal selected by the author, it was stated.

Vital Statistics from the 1940 Census.—The division of vital statistics of the Bureau of the Census is beginning an extensive program of special studies of data from the sixteenth decennial census, according to *The Registrar,* the official news bulletin of the bureau. The studies will appraise the accuracy and completeness of vital statistics data and analyze their social implications whenever possible, it was said. Subjects of the studies are the following: mortality from diseases of the heart, completeness of birth registration, results and problems of residence allocation of births and deaths, birth and death rates, urban-rural differences in mortality and natality, marriage and divorce statistics, differentials in judicial and penal treatment of offenders, distribution and characteristics of patients in mental institutions, medical care of patients in institutions and comparability of mortality statistics.

Conference on Electrical Aids to Medicine.—The committee on basic sciences of the American Institute of Electrical Engineers is arranging a conference on "New Electrical Aids to Biological and Medical Research" at the annual meeting of the institute in Philadelphia, January 29. Technical papers are to be presented by physicists with discussions by physicians. The speakers will be:

Robley D. Evans, Ph.D., associate professor of physics, Massachusetts Institute of Technology, Cambridge, Mass., The Cyclotron.
Albert Prebus, Ohio State University, Columbus, The Electron Microscope.
John G. Trump, Sc.D., Massachusetts Institute of Technology, Cambridge, High Voltage X-Ray Sources.

Physicians who will discuss the papers will include Drs. Francis Carter Wood, New York, and Richard Dresser, Boston.

Meeting on Industrial Medicine.—The annual winter clinical session of the Central States Society of Industrial Medicine and Surgery was held at St. Luke's Hospital, Chicago, December 6. The speakers included:

Dr. Fremont A. Chandler, Chicago, Spondylolisthesis.
Dr. Roland P. Mackay, Chicago, Mental Conditions Associated with Trauma.
Dr. Wesley A. Gustafson, Chicago, Spinal Cord Injuries.
Dr. Will F. Lyon, Chicago, Hernia in Industry.
Dr. George L. Apfelbach, Chicago, Causes of Impaired Union in Fractured Hips.
Dr. Harry Culver, Chicago, Traumatic Lesions of the Genito-Urinary Tract.
Dr. Cleveland J. White, Chicago, Industrial Dermatitis, Their Diagnosis, Scope and Prevention.
Drs. Oscar A. Sander, Milwaukee, and Harold E. Davis, Chicago, The Silicosis Problem After Eight Years of Medical and Engineering Control.
Dr. James A. Jackson, Madison, Wis., Open Reduction Treatment of Fractures.

Dr. Clay Ray Murray, New York, guest speaker at the evening session, discussed "Correlation Between Fracture Treatment and Fracture Pathology."

Health of the Migratory Indigent.—The U. S. Public Health Service recently made a study of the health of transients, variously estimated at from two hundred thousand to a million persons, and presented recommendations for solution of the medical problems involved in caring for them. Difficulties facing these people are especially urgent in view of the fact that almost two thirds of the agencies giving medical care to transients restrict care to emergency or selected cases, the report said. Transients have more disabling illness than residents, it was found. As a result of the grossly poor living conditions, typhoid and dysentery have a high incidence and malnutrition appears to be common. Migration and transiency must be recognized as permanent characteristics of American life, the study concluded, and an organization of federal level should be created to direct and influence it. Medical care should be provided for all needy persons, regardless of residence, through planned cooperation of state and federal governments, it was recommended, with administration of the program centered in the local agency responsible for care of needy residents. Finally, particular concentration of transients in a state should be considered a special health problem in the allotment of federal funds for the maintenance and improvement of local public health facilities, the report concluded.

Special Society Elections.—Dr. Leon J. Menville, New Orleans, was named president-elect of the Radiological Society of North America at the annual meeting in Cleveland in December, and Dr. William Walter Wasson, Denver, was installed as president. Vice presidents elected were Drs. William E. Costolow, Los Angeles; Orion O. Feaster, St. Petersburg, Fla., and David S. Beilin, Chicago. Dr. Donald S. Childs, Syracuse, N. Y., was reelected secretary.——Marshall A. Barber, Ph.D., New York, was elected president of the American Academy of Tropical Medicine at the recent annual meeting in Louisville, Ky.; Dr. Herbert C. Clark, Panama, R. P., vice president, and Ernest Carroll Faust, Ph.D., New Orleans, secretary.——Dr. Charles A. Thomas, Tucson, Ariz., was named president-elect of the Southwestern Medical Association at its annual meeting in Tucson in November, and Dr. William H. Woolston, Albuquerque, N. M., was installed as president. Drs. Kevin D. Lynch, El Paso, and James W. Hannett, Albuquerque, were elected vice presidents and Dr. Louis W. Breck, El Paso, secretary. The next annual meeting will be in El Paso. Dr. Franklin H. Maury, Tucson, was elected president of the Southwest Academy of Eye, Ear, Nose and Throat, which met at the same time, and Dr. Archie E. Cruthirds, Phoenix, Ariz., secretary.——Dr. Henry Franklin Carman, Dallas, Texas, was elected president of the Southern Tuberculosis Conference at its annual meeting in Monroe, La., in October. Mr. J. P. Kranz, executive secretary of the Tennessee Tuberculosis Association, Nashville, Tenn., was elected secretary.

CANADA

Society News.—Dr. Waltman Walters, Rochester, Minn., addressed the Academy of Medicine of Toronto, December 3, at a meeting with the eleventh district of the Ontario Medical Association on "Lesions of the Biliary Tract."

New Director of Connaught Laboratories.—Dr. Robert D. Defries, associate director of Connaught Laboratories, University of Toronto, since 1917, has been appointed director to succeed the late Dr. John G. FitzGerald. Dr. Defries took his medical degree from the University of Toronto Faculty of Medicine in 1913 and joined the staff of the laboratory in 1915. He has been professor of hygiene and epidemiology and head of the department of epidemiology and biometrics since 1930 and associate director of the school of hygiene since 1925.

LATIN AMERICA

New Society of Urology.—Formation of the Venezuelan Urological Association at a meeting in Caracas was recently announced. Dr. Alfredo Borjas was elected president; Dr. L. Rodriguez, vice president, and Dr. Leopoldo E. Lopez, secretary. The society is planning the first Venezuelan Congress of Urology to be held in Caracas in May.

Pan American Congress of Endocrinology.—The second Pan American Congress of Endocrinology will be held in Montevideo, Uruguay, March 5-8. The following sections are being organized: medicine, pediatrics, cardiology, psychiatry, odontology, surgery, urology, obstetrics and gynecology, physiology, histology and pathologic anatomy, biology, therapeutics, radiology and a medicosocial section. Dr. Juan C. Mussio-Fournier, Montevideo, is president of the congress and Dr. Pedro A. Barcia, Montevideo, is secretary. The official topics and those in charge of them are as follows:

Dr. Bernardo A. Houssay, Buenos Aires, Regulation of the Endocrine Function of the Pancreas.
Prof. Alejandro Lipschütz, Santiago, Chile, Endocrine Basis of the Origin of Tumors of the Female Genital Organs.
Prof. Mariano R. Castex and Dr. Mario Schteingart, Buenos Aires, Present Status of Hormone Therapy in Genital Disorders.
Prof. Mussio-Fournier and Drs. J. M. Cerviño and Juan J. Bazzano, Montevideo, Cardiovascular System in Thyroid Insufficiency.
Prof. Emilio Mira y Lopez, Habana, Cuba, Present Concept of the Endocrine Psychoses.
Prof. Alberto Peralta Ramos, Buenos Aires, Endocrine Correlation in Disorders of the Genital Cycle.
Prof. Clemente Estable, Montevideo, Relationships of the Endocrine Glands to the Eyes.
Prof. L. Fraenkel and Drs. J. C. Barsantini and W. Buño, Montevideo, The Mammary Gland and the Endocrine Glands: Neurohumoral Interrelationships.
Fred C. Koch, Ph.D., Chicago, Excretion and Metabolism of the Male Sex Hormone in Normal and Pathologic Conditions.
Dr. Thales Martins, Rio de Janeiro, Recent Advances in Knowledge of the Biologic Activity of the Male Hormone.
Dr. Herbert M. Evans, Berkeley, Calif., Present Knowledge of the Hormones of the Anterior Hypophysis.
Prof. Carlos Foã, São Paulo, Biologic and Chemical Methods in the Service of Endocrinologic Diagnosis.

Information may be obtained by addressing II Congreso Pan-Americano de Endocrinología, Casilla de Correos 255, Montevideo, Uruguay.

Hospital Honors Harvey Cushing.—Salvador Hospital, Santiago, Chile, dedicated a new wing in honor of the late Dr. Harvey Cushing of Boston, November 7. A full length portrait of Dr. Cushing was unveiled by United States Ambassador Claude G. Bowers. The president of Chile, the minister of health and other officials were present, the New York *Times* reported.

Dr. Clark Receives Walter Reed Medal.—Dr. Herbert C. Clark, director of the Gorgas Memorial Laboratory of Tropical and Preventive Medicine, Panama, R. P., received the Wal-

ter Reed Medal of the American Society of Tropical Medicine at the annual meeting in Louisville, Ky., in November, in recognition of his years of work in the eradication of malaria and other tropical diseases. Dr. Clark, a native of Indiana, graduated from the University of Pennsylvania School of Medicine in 1906. He served as pathologist of the laboratory of the board of health at Ancon, C. Z., from 1909 to 1922 and was later with the United Fruit Company for several years. He became director of the Gorgas laboratory in 1929.

FOREIGN

Society News.—The French Red Cross has recently been reorganized by the union of three separate societies formerly in existence, the Red Cross *Courier* reports. Dr. Pasteur Vallery-Radot has accepted the presidency.

Alien Physicians May Practice in Australia.—The West Australian parliament recently passed a bill permitting qualified alien physicians to practice in certain country districts inadequately supplied with medical service. These districts are to be declared areas for regional registration. Sixteen centers in West Australia are said to be without physicians, owing to enlistments in the army. A hospital may be similarly designated and registration confined to the hospital. After holding registration for seven years for a regional area a physician may be registered throughout the state, according to a dispatch from the Australian Associated Press. The alien has the right of appeal against a medical board's refusal to register. New South Wales, Queensland and South Australia permit registration of alien physicians who have completed a shortened course at an Australian university, but Victoria does not, the dispatch says.

Deaths in Other Countries

Dr. Charles William Mansell-Moullin, examiner in surgery at the universities of Oxford, Cambridge and Glasgow and author of works on ulcer of the stomach and on tumors, died in London, November 10, aged 89.——**Dr. Anton Schnöller,** Davos, Switzerland, tuberculosis specialist, said to have been one of the first physicians to practice the pneumothorax treatment, died in Zurich, November 3, aged 75.——**Dr. Adolpho Lutz,** for many years chief of the department of medical zoology at the Institute Oswaldo Cruz, Rio de Janeiro, died, October 6, aged 84. According to "Who's Who in Latin America," Dr. Lutz was at one time director of a leper colony in Hawaii and later director of the bacteriologic institute of the state of São Paulo. In the latter capacity he demonstrated by experiments on himself that yellow fever was transmitted by the Stegomyia mosquito, organized a campaign and eradicated the disease from the state.——**Dr. Desiré Glibert,** one of the leading men in industrial hygiene in Europe, died in Belgium, October 15, aged 81. He entered the new field of factory inspection in Belgium with its foundation in 1895, became chief inspector and in 1919 created an independent department for medical survey of industrial plants, of which he was head up to 1929. He was president of the international permanent committee for research on occupational diseases. Glibert published investigations on mercury poisoning and silicosis, but his lasting merit is in medical factory inspection, the protection of workers and the compensation for occupational diseases in Belgium.

CORRECTION

Control of Venereal Diseases in Argentina.—In the Buenos Aires letter in THE JOURNAL, Nov. 16, 1940, page 1736, the figure in the fifth line in the second column at the top of the page should have been 0.49 per cent instead of 49 per cent.

Government Services

Changes of Station in U. S. Public Health Service

Passed Asst. Surg. Wilson T. Sowder has been relieved at Morristown, Tenn., and ordered to Pensacola, Fla., to establish headquarters and Passed Asst. Surg. Charles S. Sample Jr. has been relieved at Springfield, Mo., and assigned as chief medical officer at the federal reformatory at El Reno, Okla.

Division of Chemotherapy in National Institute of Health

The U. S. Public Health Service announces the formation of a new division of chemotherapy in the National Institute of Health to be under the direction of Dr. William H. Sebrell Jr. The new unit will be concerned with research on sulfanilamide products, new synthetic drugs with antimalarial properties to make the United States independent of the Dutch East Indies supply of quinine, new synthetic drugs to supplement the supplies of opiates and studies relating to aging and nutrition. The chemotherapy division will have quarters at the National Institute of Health in Bethesda, Md., in a laboratory building now being equipped. The building will also be the headquarters of the divisions of chemistry and zoology.

Positions Open for Dental Workers

The U. S. Civil Service Commission announces vacancies for dental workers in the U. S. Public Health Service, Federal Security Agency, Veterans Administration and the War Department. The positions are dental laboratory mechanic, salary $2,000; assistant dental laboratory mechanic, salary $1,440, and dental hygienist, salary $1,620. Applications will be accepted at the commission's Washington office not later than February 3 if received from states east of Colorado and not later than February 6 if received from Colorado and states westward. Applicants must have completed at least fourteen units of high school study; otherwise, they must pass a written test. All will be rated on their education and experience as shown by their applications and corroborative evidence. Further information and application blanks may be obtained from the Secretary of the Board of U. S. Civil Service Examiners at any first or second class post office or from the commission at Washington, D. C.

Examination for Appointment to Public Health Service

The U. S. Public Health Service announces an examination for appointment in the commissioned corps in the grade of assistant surgeon (medical only). Applicants must not have passed their thirty-second birthday on the date the examination is taken, must be citizens of the United States, graduates of a recognized medical college and must have completed by July 1 next at least one year of internship or its equivalent. The compensation for this grade is $3,158 per annum with dependents and $2,699 without dependents. Candidates should arrange to have their physical examinations and prepare their autobiographies before presenting themselves at any one of the following places, where the board of examiners will be on the dates given:

U. S. Marine Hospital, Boston, January 13.
U. S. Marine Hospital, Staten Island, N. Y., January 14.
U. S. P. H. S. Building, Washington, D. C., January 16.
U. S. Marine Hospital, Baltimore, January 17.
U. S. Marine Hospital, Norfolk, Va., January 18.
U. S. Marine Hospital, Chicago, January 20.
U. S. Marine Hospital, Seattle, January 24.
U. S. Marine Hospital, San Francisco, January 27.
U. S. P. H. S. Relief Station, Los Angeles, February 3.
U. S. Marine Hospital, St. Louis, February 7.
U. S. Marine Hospital, Cleveland, February 11.
U. S. Marine Hospital, Galveston, Texas, February 14.
U. S. Marine Hospital, New Orleans, February 15.
U. S. P. H. S. Relief Station, 365 Federal Building, Miami, Fla., February 19.

Those who complete the physical examination and certain other parts of the examination will be allowed to take the written examination beginning February 24 either at the place where the physical examination was conducted or at some other nearer point; or candidates may elect to go to Washington, D. C., to take the entire examination. The written and clinical portions of the examination will consume about three days. Travel expenses must be paid by the applicants. Application blanks may be obtained by writing to the Surgeon General, U. S. Public Health Service, Washington, D. C. The forms may be filled out and delivered personally to the board of examiners or blanks may be had from the board at the time the applicant appears for examination. Applicants will be required to present their diplomas and evidence of United States citizenship to the board. Diplomates of the National Board of Medical Examiners are required to present their certificates to the board.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Nov. 30, 1940.

The Bombing of London Hospitals

The bombing of two of the great London hospitals—the London and St. Thomas's—has been described in previous letters. St. Thomas's has had to be evacuated. What occurred there has been reported in the *Lancet* by a correspondent, who is a member of the staff. He came by taxicab one morning and found the way near the hospital blocked by masses of fallen masonry, so that he had to get out and walk. His colleagues who had spent the night at the hospital looked somewhat shaken, which was not surprising, for their windows had been blown in and their beds covered with glass and with plaster from the ceiling. Desperate efforts were made to rescue those buried under the fallen masonry. It was hoped to save at least one alive, but when the tunnelers reached a woman after several hours' dangerous work she died before she could be extricated. During the night the bombing continued. One ward was occupied by 25 gynecologic patients, most of whom had undergone operation within a few days. Every bed was covered with glass, but not a patient had been scratched. The nurses removed the glass-covered blankets and put new ones on every patient. When rescuers arrived the patients were all singing in the dark. There was no option but to evacuate all the patients from the hospital. During the afternoon by strenuous effort of the engineering staff more water and electric power became available. The staff and governors unanimously decided to reopen the hospital by improvising wards in the basement and strengthening those on the ground floor.

By the following week two hundred and six beds were made available. While some members of the staff were in their room near the center of the hospital, the sirens sounded and they went downstairs to take up their places in the central hall, which had been planned as a receiving room for casualties. While four or five of the staff were sitting on a bench they suddenly saw a vast sheet of flame accompanied by a devastating explosion. Those who were not blown off the bench sat huddled waiting for the roof to fall on them. Large missles hurtled all round, but nobody was touched. For a moment or two there was silence, then a babel of talking and shouting. A woman's voice said plaintively "I don't think I am going to like this at all." Torches were flashed but were almost useless in the dust and mirk. A voice shouted "Go carefully—there may be no floor." Carefully made plans had been wrecked in a moment. The reception room was devastated, the operating room wrecked. Already men were bringing in casualties and asking where to put them, and for a time nobody knew. Difficulties were increased by the darkness; one could not find one's colleagues, but in a remarkably short time order was restored. Members of the staff went into the wrecked operating room and grabbed everything they could find, carrying it out on stretchers, trays and tables and in their pockets. Within an hour a new operating room had been improvised at the other end of the hospital, and a surgical team complete with overalls and masks was operating.

The London Hospital is the largest of the voluntary hospitals of the metropolis and covers 9½ acres. In the board room is a large map marked with colored circles, each bearing a date, which is that when a bomb fell on that spot. Twenty-one bombs—incendiary, high explosive and of small caliber—have hit the hospital. Ten thousand panes of glass have been broken. Nevertheless three hundred beds, about a third of the normal for the hospital, are in use. There is also a large first aid post. The work of the hospital is all conducted on the first, ground and lower ground floors. The hospital has its own squad of fire fighters, who have been able to reduce the damage which otherwise might have been done. The medical college has been badly damaged and the top floor of the nurses' home has been struck by an incendiary bomb, but the rest of the building was saved because the floor was of stone. The wards and administrative offices of the hospital are all shored up. There are now in use two hundred casualty beds and one hundred for the civilian sick, the hospital having otherwise been evacuated according to the scheme explained in previous letters. The hospital population is kept on the move; as soon as patients can be transported they are sent to the safer "sector" hospitals. Thus beds are always available for emergencies.

The Hygiene of Air Raid Shelters

The large number of persons who spend the night in air raid shelters has produced a serious sanitary problem. In London a hundred thousand persons sleep at night on the platforms and passages of the tube railways—a use for which they were never intended. The government appointed a committee under the chairmanship of Lord Horder to investigate the sanitary conditions of the London shelters and make recommendations. It reports that the evacuation from London of four hundred and eighty-nine thousand school children, 56 per cent of the whole, as well as the transfer to hospitals of the emergency medical service in the country of four thousand aged and infirm persons who frequented the shelters, was a help. The committee recommended the appointment of whole time shelter marshals and the provision of adequate sanitary accommodations. In every shelter for more than five hundred people there should be a first aid post and a sick bay, and a physician should be in residence during the night or available at call. Beds and bunks should be allotted to the medical post at the rate of two beds and three tier bunks for every five thousand persons. At first the ordinary standards of ventilation could not be fulfilled. But until the present overcrowding is eased a standard 50 cubic feet per person should be followed. A dominant factor in the air pollution of shelters is the presence of closets. It is recommended that wherever possible the men's closets should be placed outside the shelters. The risk of air-borne infection should be reduced by spraying with solution of sodium hypochlorite.

A committee of architects, engineers, scientists and physicians under the chairmanship of Prof. J. B. S. Haldane advocates the universal provision of deep shelters. So far only surface shelters of brick or corrugated iron have been provided in most places. They protect against blast or bomb fragments but not against a direct hit and therefore are regarded as inadequate. The committee advocates bomb proof shelters of reinforced concrete and also increased underground accommodation by extension of the tunnels of the London underground railways.

The Employment in Hospitals of Alien Physicians and Nurses

The large number of aliens from enemy countries has presented the government with a difficult problem. They are usually refugees from persecution, but there is always the possibility that enemies may be among them. Therefore the government has interned large numbers as a measure of safety, but this has been an injustice to many, who on further inquiry have been released. Hospitals were prohibited from employing persons of enemy nationality. This prohibition has now been withdrawn in districts outside the protected areas (areas in which there is special danger from enemy action). In the nonprotected areas persons of German, Austrian and Italian nationality may be employed as physicians, medical students or nurses subject to the following conditions: 1. In the event of invasion or other

serious military situation, which would make it necessary for the military authorities to take full control of the area, they may find it necessary to order the immediate removal from the hospital of the persons in question. 2. Every effort should be made to segregate military or naval patients in separate wards, in which the aliens must not be employed. 3. Wherever practicable alien physicians and nurses should be employed only in wards where British physicians also are engaged. 4. The number of aliens of enemy nationality who may be employed in a hospital must be limited in relation to the total staff. For this purpose account should be taken of the following categories: physicians, nurses, other professional and technical workers, students. Within any of these categories not more than 10 per cent of the personnel (or 20 per cent in the case of hospitals of less than one hundred beds) may be aliens of enemy nationality. Permits from the Aliens War Service Department will be required before an alien can be employed.

Ample Supplies of Essential Foods

Though we are rationed for some important foods such as meat, fats, butter and sugar, other food supplies are ample, thanks to maintenance of imports and increase of home production. The country is unlikely to suffer from any lack of essential food supplies in the second winter of the war. In framing its policy the government has followed the advice of scientists on relative food values. The whole scheme of production from our own soil and food importation is related to a basic diet which will most economically support a healthy population. Any necessary temporary reduction in imports due to the need for cargo space to carry munitions of war will be in less essential foodstuffs. It has just been decided that bananas are not essential and that their importation must stop. This decision has provoked protest from the fruit trade, which points out that it will be difficult for the public to follow the Ministry of Food's advice to eat fresh fruit. In normal times bananas represent more than a fifth of our total fruit consumption. Coming after the loss of American apples and pears and the curtailment of orange, lemon and onion imports, it is claimed that fruit imports will be reduced to a third of their prewar figure. One result will be an increase in the retail price of vegetables as the only way of meeting fixed overhead charges. Prewar imports of bananas amounted to 300,000 tons annually. The plans for stimulating home production are all directed to increasing the supply of essential foods and checking production of luxuries. Priority is given to milk, potatoes, bread and vegetables. The standardization of certain foodstuffs, such as margarine, is being pressed forward. Some essential foods, such as bread, are subsidized so as to keep the price down for those of limited means.

On the recommendation of the Food Rationing Committee of the Medical Research Council, appointed to advise as to the necessity for modifying the allowance in certain cases, the following additions have been authorized by the minister of food: In diabetes mellitus one extra ration of meat and two extra rations of butter and margarine each week. In spontaneous hypoglycemia two extra rations of sugar a week. In steatorrhea (celiac disease, celiac infantilism and tropical sprue) three extra rations of meat each week in exchange for the butter-margarine ration. The present ration of sugar in ordinary cases is 8 ounces a week, of butter 4 ounces and of margarine 2 ounces.

Compensation for Byssinosis

A bill has passed through parliament granting compensation to workmen for byssinosis (disease due to inhalation of fine particles of cotton dust which penetrate deeply into the lungs, producing chronic bronchitis complicated by emphysema and in some cases by asthma) after not less than twenty years in dusty processes of the cotton industry. The disease is prevalent among operatives in cotton rooms, cotton blowing rooms and card rooms. The bill applies only to males, as it is caused by heavier process in cotton mills on which women are not employed. The disease was not previously scheduled under the workmen's compensation act because in many cases the diagnosis was so difficult that the general practitioner or even the factory examining surgeon could not be certain that it was occupational in the case of a particular man. A committee was therefore set up by the government, which reported that when there was total incapacity after not less than twenty years' employment in the industry a medical board should be able, after considering the industrial history as well as the medical evidence, to decide whether the disease was occupational. A scheme is to be followed within the workmen's compensation act on the lines of the schemes already followed for silicosis and asbestosis.

Home Food Supplies

In the House of Commons the minister of agriculture gave a reassuring picture of the increased contribution to our national food supply which is being made at home. The plowing of two million additional acres is a great gain and the number of cattle, particularly dairy cattle, has been increased. We enter the second winter of the war with considerably increased meat reserves. British agriculture is in a well balanced condition and well able to face the demands which next year's campaign may make on food production. It is the policy of the government that milk production must come first. Although milk production decreased as a result of last year's hard winter, there is good reason to hope for an improvement this winter. The aim of the government is to secure the maximum of food production necessary to maintain the health of the nation in wartime. Much attention is being given to nutrition. Experts whose advice has been sought agree in putting among the vital requirements bread, milk, potatoes, oatmeal, vegetables and fats. Meat does not fall within this category but is admitted to be desirable, if only because regard must be paid to the habits of the people and the foodstuffs they like.

Marriages

WILLIAM PROVINCE MCGUIRE, Winchester, Va., to Miss Dorothy Elizabeth Robinson of Paterson, N. J., in October 1940.

CHARLES S. NORBURN, Asheville, N. C., to Miss Helen Sophia Johnson at Merryvale, Tenn., in November 1940.

IRVING E. SCHIEK JR., Rhinelander, Wis., to Miss Mary Margaret Hughes of Milwaukee, Sept. 21, 1940.

JOHN KENNETH KARR, Milwaukee, to Miss Mary Caroline Ielmini of Bessemer, Mich., Aug. 17, 1940.

THOMAS NORWOOD LIDE, Washington, D. C., to Miss Janet Ormond of Durham, N. C., Oct. 12, 1940.

ARNOLD E. NAEGELI, St. Paul, to Miss Audrey Elinor Miller at Toronto, Ont., Canada, Oct. 31, 1940.

CLARENCE JOSEPH KURTH, Council Bluffs, Iowa, to Miss Jean Burke of Omaha, Sept. 14, 1940.

JOSEPH PANCOAST REATH, St. Davids, Pa., to Miss Sarah Ann Mitchell of Wayne, Nov. 23, 1940.

FREDERICK J. STODDARD to Miss Annette E. Dods, both of Ann Arbor, Mich., Sept. 7, 1940.

LOREN E. COLLINS, Estherville, Iowa, to Miss Ida Lieber of Spearfish, S. D., Aug. 27, 1940.

JEFF J. BAGGETT to Miss Frances Gose, both of Prairie Grove, Ark., Oct. 26, 1940.

ELMER C. PAULSON, Dalton, Minn., to Miss Ethel Mobraaten of Virginia, Aug. 3, 1940.

ABNER BURESH to Miss Jean Cray, both of Lime Spring, Iowa, Nov. 28, 1940.

Deaths

Thomas Shepard Southworth ✠ New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1887; an Affiliate Fellow of the American Medical Association; member of the American Pediatric Society and president in 1920; secretary of the Section on Diseases of Children of the American Medical Association 1902-1903 and chairman, 1908-1909, and member of the House of Delegates in 1907; formerly consulting physician to the New York Nursery and Child's Hospital and the New York City Children's Hospital; aged 79; died, Nov. 14, 1940, in the Columbia-Presbyterian Medical Center of cerebral hemorrhage.

Richard Schillinger ✠ Richmond, Ind.; Miami Medical College, Cincinnati, 1894; past president of the Wayne County Medical Society; for many years member of the board of health; formerly mayor; for many years president of the staff of the Reid Memorial Hospital and chairman of the executive committee; president of the county pension examiners' board; medical superintendent of the Richmond State Hospital; aged 69; died, Nov. 21, 1940, in the Good Samaritan Hospital, Cincinnati, of cerebral hemorrhage.

Melvin Harvey Walker Jr. ✠ Pittsfield, Mass.; Harvard Medical School, Boston, 1915; fellow of the American College of Surgeons; served during the World War; was a member of the city board of health for many years; visiting surgeon, House of Mercy Hospital, Pittsfield, and Fairview Hospital, Great Barrington; on the associate staff of St. Luke's Hospital; aged 54; died, Nov. 21, 1940, of coronary thrombosis.

Norman Leslie Rowe, Jersey City, N. J.; Columbia University College of Physicians and Surgeons, New York, 1900; member of the Medical Society of New Jersey; physician in the public schools for many years; served during the World War; formerly member of the city board of health; on the staff of the Fairmount Hospital; aged 63; died, Nov. 30, 1940, in the Medical Center of Jersey City of carcinoma.

David Collins Roach, Burlington, Ill.; Northwestern University Medical School, Chicago, 1894; member of the Illinois State Medical Society; mayor of Burlington; for many years bank president; served during the World War; aged 69; on the staff of St. Joseph Hospital, Elgin, where he died, Nov. 18, 1940, of hypertension, nephritis and chronic myocarditis.

Theodore Frederic Myler ✠ Xenia, Ohio; University of Pennsylvania School of Medicine, Philadelphia, 1909; served during the World War; aged 56; formerly on the staff of the Ohio Soldiers' and Sailors' Orphans Home Hospital; on the staff of the McClellan Hospital, where he died, Nov. 27, 1940, of coronary thrombosis.

Carey Andrew Gray ✠ Bonham, Texas; Louisville (Ky.) Medical College, 1895; member of the House of Delegates of the American Medical Association in 1928; past president of the Fannin County Medical Society; on the staff of the S. B. Allen Memorial Hospital; aged 76; died, Oct. 13, 1940, of coronary thrombosis.

Joseph Piedalue ✠ Lewistown, Mont.; Victoria University Medical Department, Coburg, Ont., Canada, 1885; an Affiliate Fellow of the American Medical Association; for many years health officer of Bozeman and Gallatin County; aged 81; died, Nov. 27, 1940, in St. Vincent Hospital, Billings, of mitral stenosis.

George Alfred Smith, Clinton, Iowa; State University of Iowa College of Medicine, Iowa City, 1881; veteran of the Spanish-American War; formerly member of the state board of health; health officer; aged 86; died, Nov. 11, 1940, in the Jane Lamb Memorial Hospital of gastritis and colitis.

George W. Poovey, Lancaster, S. C.; College of Physicians and Surgeons, Baltimore, 1891; member of the South Carolina Medical Association; served during the World War; formerly mayor; aged 73; died, Nov. 2, 1940, of hypertension and angioneurotic edema of the tongue and pharynx.

Solomon Seilikovitch, Philadelphia; Medico-Chirurgical College of Philadelphia, 1893; member of the Medical Society of the State of Pennsylvania; formerly on the staff of the Mount Sinai Hospital; aged 75; died, Nov. 17, 1940, of hypertensive and arteriosclerotic cardiovascular disease.

Frederick Merwin Heller ✠ Pueblo, Colo.; Northwestern University Medical School, Chicago, 1912; on the staff of St. Mary Hospital; served during the World War; aged 56; died, Nov. 12, 1940, in Rochester, Minn., of edema of the lungs and coronary sclerosis.

Thomas Alvin Hays ✠ Burns City, Ind.; Medical College of Indiana, Indianapolis, 1892; an Affiliate Fellow of the American Medical Association; aged 78; died, Nov. 27, 1940, in the Daviess County Hospital, Washington, of valvular heart disease.

Santiago Icasiano y Bello, Bulacan, Philippine Islands; Universidad de Barcelona Facultad de Medicina, Spain, 1891; at one time chief physician of the Culion Leper Colony; aged 79; died, Sept. 6, 1940, in St. Anthony's Hospital of bronchopneumonia.

Ellen Amelia Sherman, McGregor, Iowa; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1879; member of the Iowa State Medical Society; aged 90; died, Nov. 2, 1940, of chronic myocarditis and senility.

Reed Spencer Johnson, Pikeville, Ky.; University of Louisville Medical Department, 1912; member of the Kentucky State Medical Association; on the staff of the Methodist Hospital; aged 58; died, Nov. 21, 1940, of carcinoma of the throat.

Thomas Jefferson Patton, Oxford, Ala.; Medical College of Alabama, Mobile, 1906; member of the Medical Association of the State of Alabama; aged 59; died, Nov. 3, 1940, at the Garner Hospital, Anniston, of acute duodenal ulcer.

George Oates, Grover, N. C.; University of Louisville (Ky.) Medical Department, 1894; member of the Medical Society of the State of North Carolina; aged 68; died, Nov. 2, 1940, in Rutherfordton of cerebral hemorrhage.

Richard H. McCarty, Saratoga Springs, N. Y.; Albany Medical College, 1886; member of the Medical Society of the State of New York; aged 75; died, Nov. 16, 1940, in the Saratoga Hospital of chronic glomerulonephritis.

Beulah Marie Smith-Gruhner, Chicago; University of Illinois College of Medicine, Chicago, 1925; aged 53; died, Oct. 6, 1940, in the Albert Merritt Billings Hospital of a cerebrovascular accident.

Moses Emmett Morton, Detroit; University of Michigan Medical School, Ann Arbor, 1918; member of the Michigan State Medical Society; aged 52; died, Nov. 12, 1940, of acute dilatation of the heart.

John Charles Norton, Baltimore; University of Maryland School of Medicine, Baltimore, 1912; served during the World War; police physician; aged 53; died, Nov. 10, 1940, of coronary thrombosis.

Kenneth Lindsay Hood ✠ Belvidere, Ill.; St. Louis University School of Medicine, 1926; president of the Boone County Medical Society; aged 45; died, Nov. 25, 1940, of acute nephritis.

Helen Murphy, Philadelphia; Woman's Medical College of Pennsylvania, Philadelphia, 1893; aged 80; died, Nov. 9, 1940, of carcinoma of the rectosigmoid and hypertensive cardiovascular renal disease.

John Newton Beasley ✠ Topeka, Kan.; St. Louis College of Physicians and Surgeons, 1897; on the staff of the Stormont Hospital; aged 66; died, Oct. 29, 1940, of carbon monoxide poisoning.

Lester Irving Ofner, Roads End, Calif.; University of Illinois College of Medicine, Chicago, 1915; aged 51; died, Nov. 27, 1940, in Santa Monica of streptococcus viridans infection.

Roy La Fayette Owen, Chicago; Rush Medical College, Chicago, 1901; aged 64; died, Nov. 25, 1940, in the Illinois Masonic Hospital of prostatic hypertrophy and pyelonephritis.

Jesse Eugene Saunders, Burket, Ind.; Curtis Physio-Medical Institute, Marion, 1895; aged 70; died, Nov. 10, 1940, in the McDonald Hospital, Warsaw, of carcinoma.

Joe Newton Whittle, Gladewater, Texas; St. Louis College of Physicians and Surgeons, 1901; aged 75; died, Oct. 25, 1940, of diabetes and cerebral hemorrhage.

Frank J. Phipps, Benton, Wis.; Milwaukee Medical College, 1896; aged 80; died, Nov. 7, 1940, in a hospital at Dubuque, Iowa, of arteriosclerosis.

Cassius Adolphus Oliver, Chico, Calif.; Pulte Medical College, Cincinnati, 1880; aged 84; died, Nov. 1, 1940, of coronary thrombosis.

William Leonard Simmons, Eastland, Texas; Baltimore Medical College, 1893; aged 70; died, Nov. 2, 1940, of cerebral hemorrhage.

Montrose Day, Haynesville, La.; Missouri Medical College, St. Louis, 1881; aged 85; died, Oct. 27, 1940, of coronary thrombosis.

Correspondence

THE NATURE OF THE SNELLEN VISUAL FORMULA

To the Editor:—In the remarks of Dr. Harry S. Gradle before the Annual Congress on Industrial Health (The Journal, March 16, p. 989) on the present status of estimating disability from visual loss, one is again reminded that the Snellen formula was never intended to be a fraction or ratio but is merely an expression of what appears to be a fraction.

In Webster's unabridged dictionary a fraction is defined as one or more aliquot parts of a unit or whole number, or an expression for a definite proportion of a unit or magnitude, and a ratio as the relation which one quantity or magnitude has to another of the same kind. In this connection, then, it is frequently contended that the Snellen formula could not be an aliquot part of unity, as represented by the norm 20/20, and therefore is not a true fraction. That this position is untenable has already been clearly set forth (Gabriels, J. A. C.: The Snellen Symbol and Visual Value, *Arch. Ophth.* **55**:447 [Sept.] 1926); briefly, such visual notations as 20/30 and 20/40 have reference not to unity as indicated by 20/20 but to unity as expressed by 30/30 and 40/40, the subtending angle remaining the same as for the standard of 20/20, and each simply denoting one or more aliquot or equal parts of a linear unit. In like manner, there is in the Snellen formula a relation or comparison of two numerical values, namely 20/20 (20:20), or 20 to 20 feet, 20/30 (20:30), or 20 to 30 feet, 20/40 (20:40), or 20 to 40 feet, and so on. In the expression 20/20 the relation or ratio is 1 to 1, or unity; for 20/30, the ratio is 1 to 3, or two thirds; for 20/40, 2 to 4, or one half, and so on.

In this respect, too, witness the following: "The numerator represented the distance at which the chart should be read and the denominator the distance at which the chart actually was read. In other words, a vision of 20/20 means that the standard size chart, which should be read at 20 feet, was read at 20, whereas 20/40 means that at 20 feet the individual could only read that chart which should have been read at 40." What, may we ask, could more happily illustrate the meaning of a fraction, or ratio?

Further, it is stated that 20/50 is not 50 per cent loss of visual acuity. Obviously, by the simple process of reductio ad absurdum, this must be true—if the 10 minute visual angle represents a 50 per cent loss, then the 20 minute angle is a 100 per cent loss. Accordingly, the fractional unit cannot be the index of visual value. This is, however, hardly a valid argument against accepting these Snellen formulas as true fractions, as it has been shown that the actual or absolute measure of vision is based on the evaluation not of the fractional or linear unit but rather of the corresponding unit of surface area.

It should be pointed out that, to produce a visual impression, an object must subtend an angle of 1 minute or more, and this minimum visible applies equally to length and breath—in short, is a two-dimensional perspective. This is the principle on which the Snellen test types are constructed. Hence all monocular vision is concerned not merely with the linear or one-dimensional unit but, in the final analysis, with the two-dimensional or surface area unit—a value which, in the estimation of visual loss on the Snellen basis, is equal to the ratio of the part to the whole in minute of angle square units (i. e., square of minutes of angle increase to square of minutes of whole angle), or in an equivalent sense the square of the unit of fractional loss. All this, indeed, becomes increasingly significant from a casual consideration of the physiologic phase of the visual act no less than from a study of the anatomic architecture of the retinal perceiving layer itself.

It must be plain, then, that the solution of this problem should follow along strictly objective lines, that it does not therefore lend itself to experimental methods, however ingenious, and that, as a matter of fact, this solution is as simple as the principle underlying the construction of Snellen characters themselves.

J. A. C. Gabriels, M.D., Albany, N. Y.

"APPLIED EPIDEMIOLOGY IN A GENERAL HOSPITAL"

To the Editor:—I have read with considerable interest the article by Dr. M. E. Barnes entitled "Applied Epidemiology in a General Hospital" in The Journal, Nov. 23, 1940, page 1757. Anticipating Dr. Barnes's ideas, the Bronx Hospital in New York has had an epidemiologist since December 1933. The pioneer work in this field was done at this institution and has proved a most valuable asset. For details concerning the general subject of the hospital epidemiologist I respectfully refer the reader to:

Felsen, Joseph: The Prevention and Control of Outbreaks of Bacillary Dysentery, *Bull. Am. Hosp. A.* **11**: 27 (March) 1937.
Felsen, Joseph: Newer Concepts of Bacillary Dysentery and Other Types of Intestinal Infection, *New York State J. Med.* **30**: 1562 (Aug. 15) 1939.
Felsen, Joseph, and Wolarsky, William: The Hospital Epidemiologist, *Hospitals* **14**: 41 (Aug.) 1940; reviewed in the Year Book of Public Health, J. C. Geiger, editor, Chicago, Year Book Publishers, Inc., 1940, p. 1.

The subject was also presented before the epidemiologic section of the American Public Health Association on Oct. 17, 1939, at which time the following seven point program for the prevention of infectious diarrheas was outlined:

1. International cooperation for detecting cases at their source.
2. Certification of passengers and crews of ships as to presence or absence of infectious diarrhea at points of embarkation and before disembarkation.
3. Compulsory universal reporting by physicians of all infectious diarrheas.
4. Adequate sanitary supervision of transportation systems, summer camps, food and food handlers.
5. Education of the physician and layman in isolating every case of diarrhea until cultures for specific organisms prove negative.
6. Appointment of an epidemiologist to the staff of every hospital.
7. The prophylactic use of vaccine and serum in bacillary dysentery.

While Dr. Felsen has concentrated chiefly on the prevention of bacillary dysentery and other infectious diarrheas, he has also repeatedly called attention to the value of the hospital epidemiologist in preventing other outbreaks frequently seen in hospitals.

Lionel S. Auster, M.D., New York.

"SURGICAL TREATMENT OF HYPERTENSION"

To the Editor:—In their article on the surgical treatment of hypertension (The Journal, Nov. 30, 1940, p. 1875) Peet, Woods and Braden state that bilateral supradiaphragmatic splanchnic nerve section and lower dorsal sympathetic ganglionectomy were first introduced into this country by Peet in 1933. Publications by Fenn and myself in the *Annals of Internal Medicine* (**7**:422 [Oct.] 1933 and **7**:1201 [April] 1934) may easily have been overlooked by the authors. Later this operation was reported and illustrated in the *Annals of Surgery* (**102**:22 [July] 1935). Our first operation, as can be seen from the first publication, was done Oct. 22, 1932.

There is, of course, no question of priority in the matter, as Pieri adequately described and illustrated this approach in 1930 (La cura chirurgica delle nevrosi gastriche, Belluno, Tipografia Editrice "La Cartolibraria"). Since these early operations, which were done for juvenile diabetes, we have used the procedure for hypertensive patients but discontinued it in favor of Smithwick's method (*Surg.* **7**:1 [Jan.] 1940).

Geza de Takats, M.D., Chicago.

Medical Examinations and Licensure

COMING EXAMINATIONS

BOARDS OF MEDICAL EXAMINERS

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, January 4, page 71.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Various centers, February 10-12. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Oral.* Part II, Cleveland, May 31-June 1. Final date for filing application is April 1. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Part II, Groups A and B, Cleveland, May 28-June 1. Final date for filing application is March 15. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral.* Cleveland, May or June. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF PATHOLOGY: *Oral and Written.* Cleveland, June 1-2. Final date for filing application is May 1. Sec., Dr. F. W. Hartman, Henry Ford Hospital, Detroit.

AMERICAN BOARD OF PEDIATRICS: Chicago, May 18, following the Region III meeting of the American Academy of Pediatrics. Boston, Oct. 12. Immediately following the annual meeting of the American Academy of Pediatrics. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF RADIOLOGY. *Oral.* Cleveland, May 30-June 1. Final date for filing application is April 15. Sec., Dr. Byrl R. Kirklin, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written.* Part I. Various centers, April 2. Sec., Dr. J. Stewart Rodman, 225 South Fifteenth St., Philadelphia.

California Reciprocity Report

Dr. Charles B. Pinkham, secretary, California State Board of Medical Examiners, reports 98 physicians licensed to practice medicine by reciprocity and 17 physicians so licensed by endorsement from May 9 through October 26. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine		(1939)	Arkansas
University of California Medical School		(1934)	Missouri
George Washington University School of Medicine		(1935)	Dist. Colum.
Georgetown University School of Medicine		(1929)	Michigan
Howard Univ. College of Medicine	(1929) New York,	(1932)	Kansas
American Medical Missionary College		(1909)	Michigan
Loyola University School of Medicine		(1929)	Illinois
Northwestern University Medical School		(1936)	Illinois
Rush Medical College	(1917),	(1930)	Wisconsin, (1932) Colorado, (1937) Michigan
Univ. of Illinois College of Medicine	(1914), (1930), (1934)		Illinois, (1925) South Dakota, (1930) Arizona
Indiana University School of Medicine	(1932),	(1936)	Indiana
State Univ. of Iowa College of Medicine	(1911), (1916),	(1936)	Iowa
University of Kansas School of Medicine	(1933),	(1938, 2)	Kansas, (1936) Minnesota
University of Louisville School of Medicine		(1936)	Kentucky
Johns Hopkins University School of Medicine		(1916)	Dist. Colum.
University of Maryland School of Medicine and College of Physicians and Surgeons		(1937)	Maryland
Boston University School of Medicine		(1932)	Mass.
Harvard Medical School	(1915),	(1935)	Minnesota
Univ. of Michigan Dept. of Medicine and Surgery		(1912)	Michigan
University of Michigan Medical School	(1920),	(1932)	Michigan
Univ. of Minnesota Medical School	(1931), (1932, 2),	(1938)	Minnesota
St. Louis University School of Medicine	(1921),	(1939)	Missouri
Creighton Univ. School of Medicine	(1926), (1928),	(1931)	Nebraska
John A. Creighton Medical College		(1917)	Nebraska
University of Nebraska College of Medicine	(1932),	(1935)	Washington, (1932), (1934, 2), (1935), (1939) Nebraska
Columbia Univ. College of Physicians and Surgeons	(1925), (1930), (1931),	(1935, 2)	New York
Cornell University Medical College		(1937)	Penna.
Long Island College Hospital		(1909)	New York
Syracuse University College of Medicine		(1927)	New York
University of Rochester School of Medicine and Dentistry	(1931) Illinois,	(1938)	New York
Ohio State University College of Medicine		(1931, 3)	Ohio
University of Cincinnati College of Medicine	(1925),	(1934)	Ohio
Western Reserve University Medical Department		(1898)	New York
University of Oklahoma School of Medicine		(1936)	Oklahoma
University of Oregon Medical School	(1930), (1935),	(1936), (1938)	Oregon
Hahnemann Med. College and Hospital of Philadelphia		(1935)	Maine
Jefferson Medical College of Philadelphia		(1928)	Penna.
Medico-Chirurgical College of Philadelphia		(1909)	Penna.
Temple University School of Medicine		(1937)	Penna.
University of Pennsylvania School of Medicine		(1932)	Minnesota, (1936), (1937) Pennsylvania, (1936) New York
University of Tennessee College of Medicine	(1930), (1937, 2)		Tennessee, (1938) Mississippi
University of Texas Faculty of Medicine		(1937)	Texas
University of Virginia Department of Medicine		(1933)	Virginia, (1934) Minnesota
Marquette University School of Medicine	(1928),	(1933)	Wisconsin
University of Wisconsin Medical School		(1933)	Wisconsin
University of Alberta Faculty of Medicine		(1925)	Michigan
University of Toronto Faculty of Medicine		(1916)	Colorado, (1925) Illinois
McGill University Faculty of Medicine		(1935)	Washington
Albertus-Universität Medizinische Fakultät, Königsburg		(1927)	Illinois
University of St. Andrews Conjoint Medical School		(1934)	New York

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists	(1935, 2), (1937),	(1939)	N. B. M. Ex.
University of Colorado School of Medicine		(1934)	N. B. M. Ex.
George Washington University School of Medicine		(1934)	N. B. M. Ex.
Northwestern University Medical School		(1937)	N. B. M. Ex.
Rush Medical College	(1926),	(1937)	N. B. M. Ex.
University of Illinois College of Medicine		(1932)	N. B. M. Ex.
Harvard Medical School		(1933)	N. B. M. Ex.
University of Minnesota Medical School		(1938)	N. B. M. Ex.
Columbia University College of Physicians and Surgeons		(1932)	N. B. M. Ex.
Cornell University Medical College		(1933)	N. B. M. Ex.
New York Medical College and Flower Hospital		(1937)	N. B. M. Ex.
Duke University School of Medicine		(1937)	N. B. M. Ex.
University of Pennsylvania School of Medicine		(1933)	N. B. M. Ex.

Maine July Report

Dr. Adam P. Leighton, secretary, Board of Registration of Medicine, reports the written examination for medical licensure held at Augusta, July 2-3, 1940. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Fifteen candidates were examined, 10 of whom passed and 5 failed. Two physicians were licensed to practice medicine by reciprocity and 3 physicians so licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Georgetown University School of Medicine		(1938)	86
Tufts College Medical School	(1913) 80,	(1940)	81
Univ. of Rochester School of Medicine and Dentistry		(1939)	77
University of Pennsylvania School of Medicine		(1940) 86,	87
Queens University Faculty of Medicine		(1933)	81
McGill University Faculty of Medicine		(1940)	88
Regia Università degli Studi Roma. Facoltà di Medicina e Chirurgia		(1937)	77
Universität Bern Medizinische Fakultät		(1936)	79

School	FAILED	Year Grad.	Number Failed
Boston University School of Medicine		(1933)	1
Columbia Univ. College of Physicians and Surgeons		(1937)	1
University of Montreal Faculty of Medicine		(1940)	1
Regia Università degli Studi Bologna. Facoltà di Medicina e Chirurgia		(1937)	1
Universität Bern Medizinische Fakultät		(1938)	1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Yale University School of Medicine		(1920)	New Hamp.
Jefferson Medical College of Philadelphia		(1936)	Penna.

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Harvard Medical School		(1938)	N. B. M. Ex.
New York Medical College and Flower Hospital		(1937)	N. B. M. Ex.
Duke University School of Medicine		(1936)	N. B. M. Ex.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Medical Practice Act (New York): Alleged Arbitrary Refusal of Board of Regents to Indorse Foreign Licenses.—Emerson Stanley Bailey, the petitioner, graduated from Leonard Medical College in 1905. Later that year after examination he was licensed to practice medicine and surgery in Massachusetts. He was likewise licensed in New Jersey in 1905; in West Virginia, 1909; in the District of Columbia, 1910; in Missouri, 1911, and in Ohio, 1923. Since 1905 he had been actively engaged in the practice of medicine and surgery. He served as an intern in Freedman's Hospital in Washington, D. C., from 1908 to 1910. He then became executive superintendent of Provident Hospital, St. Louis, but just how long he so served is not stated. From 1915 to 1918 he owned and operated "The Bailey Sanitarium" in St. Louis, which was licensed and supervised by the State of Missouri. From 1918 to 1928 and from 1932 to date he served as visiting surgeon at People's Hospital, St. Louis; from 1933 to date,

as chief orthopedist at St. Mary's Infirmary, St. Louis, and from 1920 to 1929, as associate visiting surgeon at the Homer G. Phillip's Hospital, St. Louis, and thereafter as visiting surgeon and a member of the dispensary staff at that institution. He is a member in good standing of the Medical Society of the City of St. Louis, of the State of Missouri Medical Society and of the National Medical Association.

On several occasions Bailey sought to be examined for a license to practice medicine and surgery in New York but he was denied the right to be examined on the ground that the medical school from which he graduated was not registered with the Department of Education of the State of New York and that it would be necessary for him to study two additional years in a registered medical school and obtain a degree therefrom before he could be examined. In 1939 he applied to the Board of Regents of the University of the State of New York requesting it to indorse the licenses he had received to practice in Massachusetts, New Jersey, the District of Columbia, Missouri, West Virginia and Ohio, which action, in effect, would permit him to practice in New York. The board denied his application without assigning any written reasons for its action and Bailey brought mandamus proceedings in the supreme court, special term, Albany County, N. Y., to compel the board to indorse the licenses referred to, alleging that the board in denying his application had acted unfairly, arbitrarily and capriciously.

Section 51 of the New York Education Law authorizes the Board of Regents to indorse a license issued by a legally constituted board of examiners in any other state or country on satisfactory evidence that the requirements for the issuance of such license were substantially the equivalent of the requirements in force in New York when such license was issued if the applicant has been in lawful and reputable practice of his profession for not less than five years prior to his application. The State of New York contended that under this statute an application for indorsement is addressed to the board's discretion and mandamus will not lie to compel the board to exercise its discretion in the petitioner's behalf. The discretion of the board, said the supreme court, while broad and rightly so, is not an absolute finality. It is conclusive when and only when it accords with the law as to what ought to have been done in the particular proceeding. Since the decision of the board conclusively determines the substantial rights of the petitioner, it is the duty of this court on an allegation that the board's action was unfair, arbitrary and capricious to inquire into the facts, and if on a fair consideration of all the circumstances and the law it was the duty of the board to grant the petitioner the relief he sought, this court must reverse the improper action and correct the wrong done. Discretion when exercised must be a sound judicial discretion and not an arbitrary act or whim.

New York, Ohio and New Jersey, continued the court, have entered into "reciprocity medical agreements" as to the issuance of licenses to practice medicine which provide that "Full faith and credit shall be given by the (licensing) board of each state to the medical examinations held by the board of either state." The record shows that the petitioner was licensed to practice medicine in Ohio in 1923. If New York State will indorse without examination an individual admitted to practice medicine in Ohio, it cannot be justly said as a matter of law that the minimum required standards of education, training and experience are lower in Ohio than in New York. It is true that in reciprocity agreements New York reserves the right to examine into the preliminary and professional education of the applicants, but like all agreements such a provision is not to be narrowly construed. Its interpretation must comport with reason and common sense, and in support of the entire instrument and its purpose. Each reciprocity agreement demands that the applicant for indorsement must first show that he is a reputable practitioner of medicine in good standing in his community and in his profession. Candidates licensed on examination under lower requirements than those now existing in the states may submit evidence of five years of reputable practice subsequent to the earning of their medical degree, which may be accepted in lieu of the preliminary and the first year of the professional requirements for the indorsement of their licenses.

The court then adverted to the fact that section 1257 of the Education Law requires applicants for licenses on the basis of examination to be examined in anatomy, physiology, hygiene, chemistry, surgery, obstetrics, gynecology, pathology, bacteriology and diagnosis. The court pointed out that the petitioner had been examined in all the statutory required subjects just stated either in New Jersey or in Massachusetts, or in both states, and that he had attained an average mark of 80 per cent in the examinations. The court also remarked that at the medical school which he attended the petitioner was taught by professors who were also professors on the faculty of the Medical School of the University of North Carolina, men who were generally recognized as possessing high qualifications and excellent reputations.

After a man has actively practiced medicine for twenty-five years and has been duly licensed to practice in five states, it is foolish, ridiculous and silly, said the court, to require him to go back to a medical school and study two years more to earn another degree, and then present himself for examination to be admitted in another state. Such a demand seems to us one in defiance of all reason. The court then adverted to section 1259 of the Education Law, which authorized the commissioner of education in his discretion, on the approval of the Board of Regents, to indorse a license or diploma of a physician from another state, or country, if the applicant has met all the preliminary and professional qualifications required for earning a license on examination in this state, has been in reputable practice for a period of ten years and has reached a position of conceded eminence and authority in his profession. No one, continued the court, can reasonably question the fact that the record shows that the petitioner has been more than the usual ordinary practitioner of medicine. It may be that on close analysis he does not come within the definition medically of a doctor who is eminent and an authority in his profession, but at least he is very well known and of more than ordinary ability.

While the supreme court did not grant the petition for a writ of mandamus, it believed that on the whole record there was no reasonable basis for apprehension regarding the petitioner's medical fitness. Accordingly, the court directed that the action of the Board of Regents in refusing the petitioner's application should be reviewed by the appellate division of the supreme court of New York, third judicial department, and so it transferred the proceedings thereto.—*Application of Bailey, 20 N. Y. S. (2d) 915 (N. Y., 1940).*

Society Proceedings

COMING MEETINGS

Annual Congress on Industrial Health, Chicago, Jan. 13-15. Dr. Carl M. Peterson, 535 N. Dearborn St., Chicago, Secretary.

Annual Congress on Medical Education and Licensure, Chicago, Feb. 17-18. Dr. W. D. Cutter, 535 North Dearborn St., Chicago, Secretary.

American Orthopsychiatric Association, New York, Feb. 20-22. Dr. Norvelle C. La Mar, 149 East 73d Street, New York, Secretary.

Central Surgical Association, Ann Arbor, Mich., Feb. 28-March 1. Dr. George M. Curtis, Ohio State University, Columbus, Ohio, Secretary.

Middle Section, American Laryngological, Rhinological and Otological Society, Chicago, Jan. 27. Dr. Walter H. Theobald, 307 North Michigan Blvd., Chicago, Chairman.

Pacific Coast Surgical Association, Los Angeles, Feb. 19-22. Dr. H. Glenn Bell, University of California Hospital, San Francisco, Secretary.

Society of Surgeons of New Jersey, Newark, Jan. 29. Dr. Walter B. Mount, 21 Plymouth St., Montclair, Secretary.

Society of University Surgeons, St. Louis, Feb. 14-15. Dr. Frank Glenn, 525 East 68th St., New York, Secretary.

Western Section, American Laryngological, Rhinological and Otological Society, San Francisco, Feb. 1-2. Dr. Robert C. Martin, 384 Post St., San Francisco, Chairman.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

20:519-654 (Nov.) 1940

Effect of Distention of Abdominal Viscera on Blood Flow in Circumflex Branch of Left Coronary Artery of Dog. N. C. Gilbert, G. V. LeRoy and G. K. Fenn, Chicago.—p. 519.

Effect of Transplanted Ischemic Kidneys and of Temporary, Complete, Renal Ischemia on Blood Pressure of Rabbits. M. Prinzmetal, H. A. Lewis, J. Taggart, H. Wilkins and D. R. Drury, Los Angeles.—p. 525.

Role of Arteriovenous Anastomosis in Peripheral Vascular Disease. K. Harpuder, I. D. Stein and J. Byer, New York.—p. 539.

Cardiac Hypertrophy Caused by Glycogen Storage Disease in a Fifteen Year Old Boy. W. Antopol, E. P. Boas, W. Levison and L. R. Tuchman, New York.—p. 546.

Simultaneous Action of Certain Drugs on Blood Pressure and on Flow in Right and Left Coronary Arteries. R. Wégria, H. E. Essex, J. F. Herrick and F. C. Mann, Rochester, Minn.—p. 557.

Studies on Auriculoventricular Conduction Time of Normal Children and of Rheumatic Children Without Signs of Rheumatic Activity. Gertrude Reyersbach and Ann G. Kuttner, Irvington-on-Hudson, N. Y.—p. 573.

Influence of Digitalis on Electrolyte and Water Balance of Heart Muscle. P. K. Boyer and C. A. Poindexter, New York.—p. 586.

Significance of Position of Subject in Evaluation of Electrocardiogram. L. S. Ylvisaker and H. B. Kirkland, Newark, N. J.—p. 592.

Chromatrophic Degeneration and Rupture of Aorta Following Thyroidectomy in Cases of Hypertension. W. B. Kountz and L. H. Hempelmann, St. Louis.—p. 599.

Observations on Cardiovascular System in Myasthenia Gravis. A. C. Taquini, W. T. Cooke and R. S. Schwab, Boston.—p. 611.

*Effect of Intravenous Administration of Quinidine Sulfate on Development of Ventricular Fibrillation Following Sudden Occlusion of Circumflex Branch of Left Coronary Artery: Experimental Study. F. H. Smith, C. G. McEachern and G. E. Hall, Toronto.—p. 620.

Left Auricle with Capacity of 1,695 Gm. of Blood in Case of Mitral Stenosis. R. L. Nelson, Duluth, Minn.—p. 627.

*Long Survival Following Coronary Thrombosis. E. H. Drake, Portland, Maine.—p. 634.

*Terminal Cardiac Mechanism in Coronary Artery Disease: Report of Two Cases. B. E. Goodrich, Detroit, and R. J. Needles, St. Petersburg, Fla.—p. 637.

Quinidine Sulfate and Ventricular Fibrillation.—Smith and his associates observed the effect of intravenous quinidine sulfate on the development of ventricular tachycardia and ventricular fibrillation produced by ligating the coronary artery in conscious dogs. The quinidine sulfate definitely accelerated the heart rate of all animals. In a few instances isolated extrasystoles were also observed. Within two or three seconds of ligation many extrasystoles appeared, and within ten seconds the normal ventricular complexes were replaced by long runs of ventricular extrasystoles. Ventricular tachycardia became well established almost immediately. In the animals that eventually recovered after ventricular tachycardia was maintained for some time, the ventricular complexes became irregular in shape, rate and amplitude. A progressive decrease in the amplitude of the ventricular complex, together with better definition of the RT segment, followed and the beating became progressively more regular until after about thirty minutes the auricular and ventricular complexes approximated the normal. Axis deviation developed within the next few days. Within eighteen to twenty-four days the electrocardiogram was essentially normal. Likewise the electrocardiograms of the dogs which died showed a rapid elevation of the RT segment, a high take-off of the T wave, a marked increase in the amplitude of the waves and an early absence of P waves. The early ventricular tachycardia was soon followed by true ventricular fibrillation. Fatal ventricular fibrillation almost always developed within ninety seconds of ligation. The doses of quinidine sulfate were relatively large but not grossly out of proportion to those used clinically. Quinidine sulfate does abolish almost completely cardiac pain, suggesting that pain pathways are separate from those which produce fibrillation reflexly. It renders the dog's myocardium more susceptible to the development of cardiac irregularities. Extrasystoles of left and right ventricular origin were recorded. Quinidine sulfate lowers the mortality of coronary occlusion in dogs. The mortality among 20 animals was 55 per cent as compared to 75 per cent in a control series.

Long Survival Following Coronary Thrombosis.—Drake reports the survival of a man (a telegrapher) for nearly forty years after coronary thrombosis. He was first seen by Drake at the age of 72, seven years before death, when he had suffered from angina for five years. The patient stated that he had experienced the same pain at the age of 40, except that at this time the pain was more severe and that it had gradually increased in intensity, came at more frequent intervals and was more easily precipitated. This state continued for several weeks, but since then the pain had not returned for twenty-seven years. At an examination in 1933 hypertension and cardiac enlargement were present. In 1935 the patient suffered a coronary thrombosis from which recovery was uneventful except for a complicating attack of arthritis. Following this he continued to have infrequent attacks of mild angina pectoris easily relieved by glyceryl trinitrate. At the age of 77 he retired. In 1938 another coronary thrombosis occurred. This attack was severe, was accompanied by marked pulmonary edema and was followed by frequent severe recurrences of pain and by cerebral embolism and left hemiplegia. He was confined to bed for four months. Infrequent attacks of angina pectoris continued. Prostatic hypertrophy, which caused nocturia, developed and unless he voided promptly on awakening an attack of angina pectoris would result. Because he feared the cardiac pain he occasionally took glyceryl trinitrate at these times to forestall an attack. On Oct. 2, 1939 he awakened with a desire to void and experienced an attack of angina pectoris which was not relieved by glyceryl trinitrate. A hypodermic injection of morphine was ordered; a half hour later he was unconscious and died within a few minutes. The body was embalmed before permission for necropsy was obtained and therefore the heart was considered unsuitable for injection studies. The heart weighed only 360 Gm. Old obstructions, with calcification, were found in the left anterior descending branch, a large branch of the left circumflex and the right circumflex artery. There were three fair-sized areas of fibrosis in the ventricular walls; the most recent one was in the posterior basal portion of the left ventricle. There was no fresh coronary thrombosis to explain the fatal attack. It seems certain that one of the three scars resulted from the myocardial infarction suffered at the age of 40. It seems that certain middle-aged patients may recover completely from coronary thrombosis and live out their span of life.

Terminal Cardiac Mechanism in Coronary Artery Disease.—Goodrich and Needles cite 2 instances in which they observed on electrocardiographic study the terminal cardiac mechanism of sudden death from coronary artery disease. One of the deaths was shown at necropsy to have been caused by marked coronary artery sclerosis (the patient had had angina pectoris). The other was the result of infarction of the anterior wall of the heart; it occurred on the tenth day after coronary occlusion. The first case supports the contention of Grieco and Schwartz that cardiac standstill should occur as frequently as ventricular fibrillation, and that if more records could be obtained additional instances of cardiac standstill would probably be discovered.

American Journal of Clinical Pathology, Baltimore

10:771-852 (Nov.) 1940

Evolution of Biologic Pathology from Ancient Animistic Beliefs. B. L. Gordon, Atlantic City, N. J.—p. 771.

Normal Nonfilament-Filament Count and Its Relation to Schilling Count. M. H. Stiles, E. F. Dirickx and M. T. Stiles, Philadelphia.—p. 783.

Aplastic Anemia. L. E. January and W. M. Fowler, Iowa City.—p. 792.

Hypertension and Kidney Function: Relationship of Albuminuria to Blood Pressure, Weight, Body Build and Surface Area. M. Brucer and S. C. Robinson, Chicago.—p. 800.

Possible Factors in Reaction of Tumors to Local Asphyxia. F. M. Allen, New York.—p. 813.

Virilism Associated with Adrenal Cell Rest Tumor. S. S. Zuckerman, Cheyenne, Wyo., and H. E. Stuckenhoff, Casper, Wyo.—p. 822.

American J. Digestive Diseases, Huntington, Ind.

7:447-512 (Nov.) 1940

Congenital Diaphragmatic Hernia: Report of Successfully Operated Case. J. H. Willard, Philadelphia.—p. 447.
I. Experimental Study of Effect of Pituitary on Motility of Gastrointestinal Tract: Preliminary Report. S. Morrison and M. Feldman, Baltimore.—p. 451.
II. Experimental Study of Effects of Pituitary and Thyroid Glands on Carbohydrate Metabolism: Preliminary Report. S. Morrison and M. Feldman, Baltimore.—p. 453.
Fate of Ingested Glucose Solutions of Various Concentrations at Different Levels of Small Intestine. H. Shay, J. Gershon-Cohen, S. S. Fels and F. L. Munro, Philadelphia.—p. 456.
Factors Influencing Digestion in Jejunum. L. C. McGee and E. S. Emery Jr., Boston.—p. 462.
Intubation Studies of Human Small Intestine: XX. Diagnostic Significance of Motor Disturbances. F. J. Ingelfinger and W. O. Abbott, Philadelphia.—p. 468.
Roentgenologic Diagnosis of Diseases of Small Intestine. B. R. Kirklin and H. M. Weber, Rochester, Minn.—p. 475.
Changes in Small Intestine Associated with Deficiency Disease. T. T. Mackie and M. A. Mills, New York.—p. 480.
*Further Observations on Clinical Use of Vitamin K. J. F. Weir, H. R. Butt and A. M. Snell, Rochester, Minn.—p. 485.
Blood in Cases of Hematemesis and Melena with Reference to Factors Influencing Hemorrhage. H. K. Moss, L. Schiff, R. L. Stevens and M. L. Rich, with technical assistance of Ellen S. Garber, Cincinnati.—p. 490.
Present Status of Gastrectomy. I. Abell, Louisville, Ky.—p. 495.
Gastrectomy, Partial, Subtotal and Total, Radiographic Phase. W. H. Stewart, New York.—p. 498.
Effects of Gastrectomy in Animals. A. C. Ivy, Chicago.—p. 500.
*Problem of Gastrectomy and Anemias. C. M. Jones, Boston.—p. 502.
Gastroscopic Observations in Resected Stomachs. R. Schindler, Chicago.—p. 505.

Clinical Use of Vitamin K.—According to Weir and his associates, the danger of postoperative hypoprothrombinemia in severe degrees of cholecystic and biliary infection has not been generally appreciated. Hypoprothrombinemia and hemorrhagic diathesis have been demonstrated in intestinal polyposis, regional ileitis, intestinal obstruction, gastrocolic fistula, pyloric obstruction and ulcerative colitis. Under such conditions a deficient diet, loss of essential substances by vomiting and diarrhea and an abnormal mucosal surface of the gastrointestinal canal are sufficient to deplete prothrombin. As in jaundice the deficiency does not become serious until after some surgical procedure designed to correct the primary condition has been performed. Whatever the mechanism causing vitamin K deficiency in biliary obstruction or infection, the prothrombin coagulation time has solved the mystery of obscure intestinal bleeding previously responsible for much postoperative morbidity and mortality. Since the availability of synthetic compounds of vitamin K the authors have used four with excellent results. Phthiocol was administered in doses of 25 to 50 mg. intravenously to 9 of 10 patients. The delayed prothrombin time was corrected, and bleeding in one case was controlled. The "naphthaldehyde" compound 1,4-dihydroxy-2-methyl-3-naphthaldehyde was given intravenously to 10 patients in doses of 10 to 20 mg. with satisfactory results except in 2 cases of cirrhosis. The preparation 2-methyl-1, 4-naphthoquinone was administered orally to 20 patients in tablets of 1, 2, 3 and 5 mg. In most instances the elevated prothrombin clotting time returned to normal within thirty-six hours after its administration. In other cases a soluble salt of this compound, 2-methyl-1, 4-naphthohydroquinone-sodium sulfonate, was given intravenously in doses equivalent to 2 mg. of 2-methyl-1, 4-naphthoquinone. Its action was prompt and effective. No untoward reactions occurred. The results were not satisfactory in 3 cases in which there was some form of cirrhosis of the liver with marked impairment of hepatic function. The authors have tried a soluble compound, vitamin K_5 (4-amino-2-methylnaphthol hydrochloride) suitable for intravenous administration. It was given to 26 patients with jaundice and 13 with gastrointestinal and miscellaneous lesions. In 6 cases of obstructive jaundice with a prolonged prothrombin clotting time this defect was readily controlled. Bleeding was encountered in 1 case and was controlled. In 1 case of severe disease of the gallbladder with hepatitis but without biliary obstruction a delayed prothrombin clotting time developed several days postoperatively and was readily controlled. In 4 cases of intestinal disease with delayed prothrombin clotting time but without bleeding, similar good results were obtained. Failure was encountered in 3 cases of cirrhosis. In 1 other case evidence of bleeding was satisfactorily controlled. The treatment in the remaining cases was prophylactic and no manifestations of bleeding were encountered at any time during the period of illness. The action of these compounds is extremely rapid and suggests a possible enzymatic activity.

Gastrectomy and Anemia.—Jones points out that animal experimentation, although of extreme interest to the development of an iron deficiency anemia after subtotal or total gastrectomy, has not indicated the exact source of the antianemic factor demonstrated by Castle to be present in human gastric juice. It is still impossible to translate to man, except by analogy, the results obtained after gastric resection in animals. In all animal experiments, anemia following gastric resection develôped only after months or years except in the presence of other factors, such as pregnancy. Two micropathologic studies suggest that in man also the macrocytic anemia characteristic of addisonian anemia does not develop unless important extragastric lesions coexist in the digestive tract. Brown showed what he interpreted as widespread evidence of enteritis in a large number of necropsy specimens from patients dying of pernicious anemia. However, because of failure to fix the tissues immediately after death these studies are open to question. Of much greater suggestive interest is the microscopic study by Jacobson of material from the stomach and intestines from various animals and human beings dying of pernicious anemia, sprue and certain other diseases. Jacobson points out the striking parallelism in the distribution of argentaffine cells in man and in the pig and the localization of the principle active against pernicious anemia in the mucosa of the gastrointestinal tract. In patients dying of pernicious anemia the argentaffine cells are completely or almost completely absent. He suggests that these particular cells are responsible for the secretion of Castle's intrinsic factor but admits that convincing proof is lacking. In spite of complete proof, on the basis of animal experimentation, a primary addisonian anemia in man as a sequel to partial or total gastrectomy is rarely to be expected. Clinical reports are fully in accord with such an assumption. Therefore it is apparent that major gastric surgery—subtotal or total gastrectomy—may be performed without fear of undue consequences to normal hemopoiesis. In spite of the relative or absolute achlorhydria that results and that secretory cells of importance to normal blood physiology may be removed, serious anemias need not be feared. An occasional severe microcytic or macrocytic anemia may in time ensue. However, in all probability such anemias are readily treated with iron or liver. The search for the site at which the intrinsic antianemic factor is formed must be pursued, but lack of accurate knowledge as to its source need not preclude proper gastric surgery.

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Simple Method of Making an Artificial Vagina. F. H. Falls, Chicago.—p. 906.

Functional and Growth Characteristics of Ovarian Struma.—According to Emge, casual statistics place ovarian strumas between 2 and 15 per cent of ovarian teratomas, usually dermoids. In his material the incidence was 4 per cent. An ovarian struma (and not necessarily a large one), under conditions yet unexplained, can seriously unbalance the metabolism of the body and at times invade other tissues through metastatic growth. Eight strumas of the ovary that have produced metastases, and a slightly larger number described as having caused thyrotoxic symptoms, have been reported. The author has encountered 2 instances of hyperthyroidism accompanying such tumors, 1 of which also produced extensive metastases. Most ovarian strumas are silent and are usually discovered accidentally at routine pelvic examinations or operation. The tumor in 1 of the author's patients was active enough functionally to disturb metabolism. The hyperthyroidism was corrected by removal of the ovarian struma. Most ovarian strumas are benign tumors with orderly growth habits. They are more common after maturity and to the author's knowledge have not been encountered in childhood. When part of an ordinary teratoma, they may freely intermingle with other tissue. When pure struma, they have a capsule formed by mesoderm derivatives. The morphologic structure of the tumor does not necessarily indicate its functional activity. Large tumors do not always present a uniform morphologic picture but may show various stages of cellular activity in different areas of the tumor. Generally their tendency is to develop into a colloid goiter rather than to maintain hyperplastic activities. When the latter is present, different degrees of hyperplastic action may occur within the same tumor. The severer types of hyperplasia are rarely encountered. From 5 to 6 per cent of these tumors may be expected to assume metastatic habits, which is not necessarily fatal. Metastases from an ovarian thyroid are usually superficial and ordinarily confined to the abdominal viscera. The presence of metastases may or may not disturb the patient's health. The author's patient, though still harboring a large amount of aberrant tissue, is in good health. Two surveys (a year apart) have failed to demonstrate osseous metastatic invasion, indicating the relatively benign character of the growth. Patients may live many years with multiple aberrant thyroids. Whether irradiation can arrest the growth of metastatic strumosis is conjectural. Most ovarian strumas store but little iodine. The storage does not parallel morphologic changes.

Carcinoma of Ovary.—Pemberton presents an analysis of 149 ovarian cancers encountered among 855 patients with ovarian tumors treated between 1906 and 1938 at the Free Hospital for Women. Four of the cancers were found in women between 26 and 30 years of age and 17, 46, 47, 28 and 7, respectively, in each progressive decade. The majority, 61 per cent, occurred between the ages of 40 and 60, average 49 years. Twenty-five, or 22 per cent, of the women were completely sterile and 15 others had had only miscarriages, substantiating Lynch's suggestion that women in whom ovarian cancer develops show a reduced fertility. There was no relation between the cancer and menstrual abnormalities. Of the 149 cancers 44 were semisolid and 70 cystic serous adenopapillary carcinomas, 10 semisolid and 18 cystic pseudomucinous adenopapillary carcinomas, 6 medullary carcinomas and 1 peritoneal pseudomyxoma. At operation all but 3 were designated as bilateral (58) or unilateral (88). Enough ascites to be noted on the operative record existed in 71 of the patients. The tumors were described as adherent to other organs in 121 instances. In 36 per cent the extent (metastasis) of the disease precluded cure, indicating the necessity of earlier diagnosis, which is to be had only by preventive examinations. The serous cancers were somewhat more malignant than the pseudomucinous tumors. The medullary carcinomas are insidious; they become adherent and grow without symptoms. Only 2 of the 6 patients noticed some swelling; the only complaint of the others was abdominal discomfort. Six metastasized to the endometrium. Because of metastasis and the frequent occurrence of bilateral growths, removal of both tubes and ovaries and hysterectomy is indicated whenever possible. Of 37 patients with semisolid serous adenopapillary carcinoma operated on five or more years ago, only 1 is living (six and a half years); 22 of the 31 who survived the operation died within two years, 4 within three years, 2 within four years, 1 in eight years and 1 in 28 years. These 2 last patients, who died of other causes than cancer, and the living patient show that apparently only 3 of 37 patients were cured by treatment. More optimism is seen among the 53 patients with cystic serous adenopapillary cancers operated on five or more years ago; 6 are untraced, 2 died postoperatively, 26 died within one to fourteen years after operation, 16 are living and well from five to twenty years after operation and 3 are living with the disease from five to fifteen years after the operation. Of 24 patients with pseudomucinous adenopapillary cancers 1 is untraced, 16 died within one and fifteen years and 7 are living and well for from five to sixteen years after operation. Only 1 of the 12 patients surviving more than five years had a semisolid tumor. Of the 114 patients discussed 37, or 32 per cent, lived five or more years after operation. The author feels that because such a large proportion (47 per cent) die within the first two years after operation it might save a patient a useless operation and convalescence if she was not operated on if the peritoneoscope showed generalized abdominal metastases. However, such patients have nothing to lose, and operation may prolong life of a few.

Cancer of Vulva.—Taussig analyzes 155 cases of vulval cancer encountered at the Barnard Free Skin and Cancer Hospital and in his private practice during the last thirty years. Except for the following the carcinomas were of the squamous type; 3 melanomas originating about the labia and urethral meatus, 12 periurethral cancers classified as vulval lesions as their exact point of origin could not be determined, 1 small labial tumor proved to be an adenocarcinoma, probably of sweat gland origin, and 3 adenocarcinomas arising from Bartholin's gland. The lesions varied from small well differentiated papillary nodules in which a positive diagnosis could be established only after careful study to tumors in which the loose-structured, undifferentiated cells resembled sarcoma. The former relatively benign lesions usually originated from the skin of the labia or prepuce and the latter from old syphilitic vestibular ulcers or from the glans of the clitoris. In 88 there was evidence of lymph gland metastasis, either as large hard fixed glands in the advanced inoperable cases or microscopic evidence in cases in which the lymphatic chain was excised. Extension of the disease to more distant lymphatics was relatively infrequent. Some of the terminal cases showed pulmonary involvement. There were 10 cases of multiple cancers that occurred either before or after the vulval carcinoma; metastasis was eliminated. The average age was 58 years. Pruritus was the most important symptom, causing 42 patients to come for examination. Other symptoms were lump, ulcer, a bloody discharge or burning on urination. Inexcusable delay in seeking medical advice was most frequent. Only 7 women sought advice within three months. The delay was often increased by failure in diagnosis or improper treatment. In spite of this, 7 such patients survived five or more years. Leukoplakic vulvitis was the etiologic factor

in almost one half of the cases. It was an underlying factor in 72 of 104 cases of epidermal (including the vulval and preputial skin) cancer. The author feels that the incidence of vulval carcinoma might be cut in half if the following measures were adopted: (1) complete vulvectomy in well developed leukoplakic vulvitis and rigid supervision in milder cases when operative treatment is refused, (2) intensive antisyphilitic treatment in tertiary lesions of the vulva, especially in Negroes, (3) removal of vulval warts in women past the menopause, (4) close observation or excision of enlarged Bartholin glands in women more than 40 years of age and (5) cautery excision or radiant treatment of urethral caruncles. He particularly stresses the advantages of surgery over nerve resection or treatment with ovarian preparations in leukoplakic vulvitis. The latter often decreases the pruritus but raises the question whether the use of carcinogenic substances may not at times predispose to the development of a cancer. Of the 155 patients, in 117, or 75.5 per cent, the tumor with or without its tributary lymph gland chain was excised. Some of the vulvectomies were only palliative procedures. About 70 per cent of vulval cancers are surgically operable. The operative mortality varied primarily with the age and physical condition of the patient rather than with the extent of the operation. There is definite evidence of the value of radical lymph gland resection. Of 74 patients seen more than ten years ago 12, or 16 per cent, survived for ten years. Of 24 patients subjected to a complete Basset operation more than ten years ago 16 survived for five years and 10 for ten years. Of the 6 who died in this second five years, 4 had recurrence of the vulvar lesion, 1 died of a new cancer originating in the breast and 1 died of acute influenzal pneumonia. Of the 10 patients who survived for ten years, only 6 are still living today. The 2 patients who have survived for the longest time were operated on sixteen and seventeen years ago, respectively.

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Circulation Time from Foot to Carotid Sinus and from Arm to Carotid Sinus of Man: II. Effects of Operation and of Administration of Thyroid Gland; Postoperative Phlebitis and Pulmonary Embolism. L. A. Smith and E. V. Allen, Rochester, Minn.—p. 1377.

*Revascularization of Ischemic Kidney. G. de Takáts and G. W. Scupham, Chicago.—p. 1394.

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Recurrence of Infection After Elective Operations in Cases of Healed Suppuration in Bones and Joints. J. B. Davis, Portland, Ore.—p. 1426.

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Familial Occurrence of Hyperplastic Gastric Polyps: Report of Two Cases; Classification of Benign Mucosal Tumors of Stomach. R. Schindler, Chicago, and F. B. McGlone, Denver.—p. 1483.

Comparative Concentration of Human Hepatic Bilirubin and Cholesterol by Gallbladder: Postmortem Study. S. J. Lloyd, Rochester, Minn.—p. 1494.

Review of Urologic Surgery. A. J. Scholl, Los Angeles; F. Hinman, San Francisco; A. von Lichtenberg, Budapest, Hungary; A. B. Hepler, Seattle; R. Gutierrez, New York; G. J. Thompson, J. T. Priestley, Rochester, Minn.; E. Wildholz, Bern, Switzerland, and V. J. O'Conor, Chicago.—p. 1505.

Revascularization of Ischemic Kidney.—De Takáts and Scupham attempted renal revascularization of 4 patients suffering from renal vascular damage. Their first patient was operated on in April 1936, at which time muscle flaps were sutured around the decapsulated and scarified kidney on both sides. Since that time 2 more patients have had a similar unilateral operation, and in another patient omentum was used to cover the kidney. In no patient was there a definite improvement. The condition of the first patient was classified as benign nephrosclerosis because of the absence of retinal hemorrhages and exudates; definite impairment of renal function was present. The urea clearance and urea ratio have not changed appreciably for four years nor has the heart shown any deterioration. The vascular encephalopathy (fleeting paralysis of the arm) has progressed to hyperactive reflexes, headaches, papilledema and blurred vision, and now after repeated strokes mental deterioration is in its terminal stage and will most likely be the cause of death. Neither renal function tests nor nitrogen retention showed any deterioration of renal function while the cerebrovascular episodes were recurring. The authors feel that the process in this case has not been influenced, although renal impairment has not progressed since the operation. The malignant nephrosclerosis in the patient for whom the omentum was used obviously carried the worst possible prognosis. He died ten months after the operation, with gradual failure of his cardiovascular and renal systems. The third patient was a 7 year old child with juvenile malignant nephrosclerosis in conjunction with congenital hypoplasia of one kidney. The anomalies consisted of unilateral hypoplasia, absence of cortical tissue with development of blind subcapsular diverticula communicating with the pelvis of the kidney and cystic spaces filled with colloid material. The authors believe that, if pediatricians habitually recorded blood pressures, juvenile malignant hypertension might be recognized earlier. The removal of a hypoplastic kidney before the other kidney suffers vascular damage seems logical. In their case the microscopic picture of the large compensatory kidney could not be distinguished from that of the hypoplastic one. Nephrectomy of the atrophic kidney might have been curative within the first few months after the onset of symptoms, two years before admission to the hospital. The unilateral decapsulation and application of a muscle flap did not arrest the disease, which ended in cardiac failure. The fourth patient was a woman of 32 suffering from lupus erythematosus, unilateral

renal disease and hypertension. She was subjected to an exploratory procedure and lumbar sympathectomy, and a left renal vascularization was performed. She died six days after the operation. The cause of death was not determined. Biopsy revealed nephritis.

California and Western Medicine, San Francisco

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*Primary Carcinoma of Lung: Importance of Early Diagnosis in Increasing Operability and Curability. P. C. Samson, Oakland, and E. Holman, San Francisco.—p. 208.
Immediate Management of Surface Injuries. G. B. O'Connor, San Francisco.—p. 211.
Interpretation of Laboratory Examinations in Diagnosis of Infectious Diseases. C. S. Keefer, Boston.—p. 214.

Primary Carcinoma of Lung.—Samson and Holman performed six total pneumonectomies for primary pulmonary carcinoma, with postoperative recovery of 4 patients. In neither of the 2 fatal cases was death due to operative shock. These 2 patients survived eleven and twenty-four days, with death resulting from purulent pericarditis and empyema, respectively. In both fatalities the pneumonectomy was on the right side. It is the authors' impression that adequate closure of the stem bronchus is more difficult on the right, owing to the relatively higher origin of the right upper lobar bronchus. In addition, mediastinal shift to the right and compensatory hypertrophy of the left lung do not take place as easily as do the corresponding mechanisms for obliteration of the left pleural cavity. Of the four postoperative recoveries 1 patient died a year later from coronary thrombosis and 1 in eight months from cerebral metastasis. Two patients are living. As with carcinoma elsewhere in the body, early diagnosis is paramount if surgery is to be effective. Thorough roentgen studies and bronchoscopy are invaluable aids in establishing a diagnosis.

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Control of Tuberculosis: II. Pulmonary Tuberculosis in Employees. Ada Chree Reid, New York.—p. 408.
Determination and Recording of Carbon Disulfide and Hydrogen Sulfide in Viscose-Rayon Industry. G. M. Reece, B. White and P. Drinker, Boston.—p. 416.

Ingestion of Lead Compounds.—According to Kehoe and his co-workers, data exist which indicate that within certain limits an approximate balance exists between lead absorption and lead excretion of men subject to occupational lead exposure. They have carried out a series of experiments in which lead in known quantities was administered regularly to normal subjects during which their daily lead intake in food and beverages and the daily output in the feces and urine were estimated. To maintain the induced lead exposure within safe limits, its dosage was kept below that previously found toxic for experimental animals and the dosage regarded as dangerous in industry. After a preliminary period of twenty-eight days of clinical and experimental study which demonstrated the existence of a satisfactory state of health and physiologic reactivity, one young man was started on 1 mg. daily of lead acetate. The experiment has been continued over a period of almost three and one half years. A second subject began taking a daily dosage of 2 mg. in a similar manner for fifteen months. Every week during the study each subject was given a physical examination, a complete microscopic blood and blood lead examination. Blood smears were made daily for counts of stippled erythrocytes and reticulocytes. No clinical evidence of the slightest harmful effect has been recognized by either subject or has been detected by the examinations. Both subjects have had intercurrent respiratory infections of minor severity which ran their normal course. One of them had a typical attack of food poisoning with diarrhea and vomiting, with recovery in three days. No appreciable changes in the lead metabolism occurred at this time. A faint but definitely punctate blue deposit developed at the margin of a central incisor in this subject. When the lesion was evacuated and treated, the deposit disappeared promptly. The other subject has not developed any gingival discoloration despite a slight gingivitis which has varied in accordance with care of his teeth. The authors conclude that: 1. The largest proportion of lead ingested by normal persons, with food or otherwise and whether in soluble or insoluble form, is eliminated in the feces without absorption. 2. Prolonged daily ingestion of lead in excess of 1 mg. by healthy adults is not only compatible with normal health and well being but is associated with such an increase in the elimination of lead as to result only in a slight and almost negligible retention. 3. The daily ingestion of slightly more than 2 mg. of lead for more than one year failed to cause any demonstrable effect on the health or well-being of a healthy

adult. It induced a level of lead elimination higher than that caused by the daily ingestion of 1 mg. and a slightly greater lead retention. 4. Maintained concentrations of 0.06 to 0.07 mg. of lead per hundred grams of blood over periods of months are entirely compatible with normal health and well-being. 5. Concentrations of lead in the urine from 0.05 to 0.15 mg. per liter are compatible likewise with normal health and well-being of adults. 6. The lead ingested in food and beverages by adult citizens in various parts of the United States varies from less than 0.1 mg. to more than 2 mg. with a mean daily value of approximately 0.32 mg. 7. The foregoing studies appear to show that there is a sufficient factor of safety in relation to the lead content of the general food materials in the United States.

Journal of Nutrition, Philadelphia

20:413-518 (Nov.) 1940. **Partial Index**

Relation of Pantothenic Acid to Filtrate Fraction of Vitamin B Complex. Mildred K. Dimick and A. Lepp, Emeryville, Calif.—p. 413.
Comparison of Nutritive Values of Raw, Pasteurized and Evaporated Milks for the Dog. H. D. Anderson, C. A. Elvehjem and J. E. Gonce Jr., Madison, Wis.—p. 433.
Influence of Lactose on Calcium Retention in Children. Rosalind Mills, Herta Breiter, Elizabeth Kempster, Beula McKey, Marjorie Pickens and Julia Outhouse, Urbana, Ill.—p. 467.
Effect of Pyrazine Acids and Quinolinic Acid on V Factor Content of Human Blood and on Canine Blacktongue. W. J. Dann, H. I. Kohn and P. Handler, Durham, N. C.—p. 477.
Placental and Mammary Transfer of Vitamin E in the Rat. K. E. Mason and W. L. Bryan, Nashville, Tenn.—p. 501.

Journal of Pediatrics, St. Louis

17:571-708 (Nov.) 1940

Correction of Distorted Fluid Equilibrium in Presence of Vascular Injury. A. S. Minot and Katharine Dodd, Nashville, Tenn.—p. 571.
*Value of Bacillus Pertussis Vaccine in Prevention of Whooping Cough in a Child-Caring Institution. J. M. Lewis, L. H. Barenberg, L. Greenspan and B. Greenberg, New York.—p. 585.
Comparative Nutritive Efficiency of Intravenous Amino Acids and Dietary Protein in Children with Nephrotic Syndrome. L. E. Farr, K. Emerson Jr. and P. H. Futcher, New York.—p. 595.
*Vitamin K in Hemorrhagic Disease of the Newborn Infant. C. E. Snelling, with technical assistance of Winnifred Nelson, Toronto.—p. 615.
Concentration of Ascorbic Acid in Plasma During Treatment of Infantile Scurvy. R. L. Mindlin, Boston.—p. 621.
*Intracutaneous Vaccination Against Smallpox by Means of Chick Embryo Culture Virus. L. Jacobs, New York, and H. Orris, Hillside, N. J.—p. 626.
Formolized Vaccinia Virus: Results of Its Use with Children Who Had Never Been Vaccinated Previously. H. H. Donnally, Washington, D. C., and A. J. Weil, Pearl River, N. Y.—p. 639.
Rocky Mountain Spotted Fever: Analysis of Eighteen Cases in Children. H. A. Ong, Washington, D. C., and J. F. Raffetto, Asbury Park, N. J.—p. 647.
Peptic Ulcer in Children: Report of Ten Cases. W. F. Burdick, Washington, D. C.—p. 654.
Massive Unilateral Pulmonary Fibrosis Due to Obstructive Tracheobronchial Tuberculosis. P. E. Rothman and R. Mapes, Los Angeles.—p. 659.
Diphtheria Treated Unsuccessfully with Sulfonamide Compounds: Report of Two Fatal Cases. S. M. Abelson and H. Leichenger, Chicago.—p. 670.
An Easy-To-Make Infant Incubator. G. H. Hess, Bisbee, Ariz.—p. 672.

Vaccine Prophylaxis of Whooping Cough.—Lewis and his associates present the following data bearing on the value of Bacillus pertussis vaccine: In an institution, 77 children from 15 months to 4 years who had been inoculated with Bacillus pertussis vaccine (Sauer) and 70 children who were not inoculated were intimately exposed to whooping cough under comparable conditions. Whooping cough developed in 24 of the inoculated children, whereas 58 of the uninoculated children were attacked. The disease was definitely less severe in the inoculated group. Three different dosages of the vaccine were employed; 80, 110 and 130 billion organisms. The incidence of whooping cough was 20 per cent among those receiving 130 billion organisms as compared to 57 per cent in the other two groups. From four months to four years prior to the epidemic 271 children were discharged from the institution. One hundred and twenty of these had been inoculated with 80 billion organisms at the institution and 151 had not been inoculated. The ages and time elapsed since discharge were comparable for the two groups. Two, or 1.7 per cent, of the inoculated children have since contracted whooping cough as compared to 22, or 14.6 per cent, of the control children. The high degree of effectiveness of the 80 billion dosage among these children was probably due to the fact that the exposures were not intensive. Under conditions of household exposure, the 80 billion dosage frequently does not prevent whooping cough although it may modify the course of the disease. Household exposure may be compared to that which existed in the institution and therefore it is probable that the 130 billion dosage would prove more effective among the intimately exposed children.

Vitamin K for Neonatal Hemorrhagic Disease.—Snelling and Nelson determined the bleeding, clotting and prothrombin time of 11 cases of hemorrhagic disease of the newborn before and after arresting the hemorrhage by various methods of treatment. The prothrombin times varied from one hundred and sixty seconds to no clot formation, and the bleeding and clotting times were elevated. After treatment when the bleeding had ceased the prothrombin time was ninety-five seconds or less and the bleeding and clotting times were within normal limits. The authors' experience for a previous five years with 64 cases shows that 12 required more than one transfusion to effect a cure. One patient received one transfusion and was still bleeding twelve hours later with only partial diminution of the prothrombin time. A second transfusion effected a cure. Another patient received a transfusion and was given natural vitamin K by mouth and a second transfusion was necessary. A third patient was cured with one transfusion and 4 cc. of vitamin K by mouth. The prothrombin time of another patient was lowered by natural vitamin K by mouth. Vitamin K by mouth is probably effective, but the possibility of its not being retained or of lack of absorption makes it an unsafe procedure. Six cases of hemorrhagic disease were treated with synthetic vitamin K (2 methyl 1-4 naphthoquinone) intravenously. The prothrombin time was decreased by the vitamin K; in 4 the bleeding stopped, in 1 case the authors felt it was because external bleeding had ceased and in their first case to be treated they did not have the courage to wait longer than one hour without administering blood. None of the babies showed any ill effects as a result of the intravenous administration of the synthetic vitamin K. In the first 2 of the 5 cases treated with vitamin K the bleeding was arrested with the hemoglobin at a normal level. In the other 3, although the bleeding was arrested, the patients were handicapped by low hemoglobin, and transfusion was given twenty-four hours after admission. This is most important because, although bleeding may be arrested with vitamin K it is also necessary to restore the hemoglobin to a normal level. The authors recommend that a hemoglobin estimation be done in hemorrhagic disease of the newborn and if decreased that vitamin K be administered intravenously with a transfusion, but that if the hemoglobin is normal only vitamin K be given. In their experience vitamin K and transfusion does away with the necessity of second transfusions.

Intracutaneous Vaccination Against Smallpox.—Jacobs and Orris studied the reactions among the residents of the poorer crowded tenement districts of New York City following the intracutaneous inoculation of chick embryo vaccine virus against smallpox. All races, colors and creeds were represented. Infants and children from 6 months to 5 years of age were in the majority, but some older children and even adults were followed for comparison and study. More than 800 infants and children were vaccinated with 0.1 cc. of chick embryo culture virus and after from six to thirty months later complete follow-up observations after dermal revaccination with Department of Health cowpox of only 290 was possible. Of 102 initially vaccinated with 0.1 cc. culture virus mixed with blood serum from donors previously vaccinated against smallpox, there were 33.3 per cent primary takes, 50 per cent accelerated takes and 16.7 per cent immune reactions. Of 137 originally vaccinated with 0.1 cc. culture virus mixed with blood serum from nonvaccinated donors, there were 10.2 per cent primary takes, 70.1 per cent accelerated takes and 19.7 per cent immune reactions. Of 42 initially vaccinated with two simultaneous injections of 0.1 cc. of pure culture virus or mixed with human blood serum from nonvaccinated donors, there were 4.8 per cent primary takes, 52.3 per cent accelerated takes and 42.9 per cent immune reactions. These two injections resulted in the highest (95 per cent) degree of immunity. It is seen that the activity of the virus is diminished if the human serum with which it is mixed has come from previously vaccinated donors. Intracutaneous vaccination with the culture virus may be done rapidly

and efficiently by the average physician. The reactions are characteristic and may be readily recognized. The course of vaccination is benign. Systemic reactions are rare. A minute scar may result in a few persons. The method appears to be the one of choice. After a lapse of about two years, revaccination with culture virus or cowpox should be made.

Kansas Medical Society Journal, Topeka

41:409-452 (Oct.) 1940

Role of Surgery in Painful Feet. E. D. McBride, Oklahoma City.—p. 409.
Clinical Approach to the Migraine Problem: Part I. General Consideration and Data. D. V. Conwell and C. J. Kurth, Halstead.—p. 413.
Id.: Part II. Preventive Treatment. D. V. Conwell, Halstead.—p. 415.
Tuberculosis Case Finding in University of Kansas Students. R. I. Canuteson, Lawrence.—p. 417.
X-Ray Interpretation in Tuberculosis Case Finding. G. M. Tice, Kansas City.—p. 420.
Prolapse of Intervertebral Disk. F. A. Carmichael Jr., Kansas City, Mo.—p. 422.
Tularemia Complicated by Septicemia and Heart Disease. D. Stump and F. Quinn, Kansas City.—p. 426.

Medical Annals of District of Columbia, Washington

9:371-412 (Nov.) 1940

Importance of Cardiovascular-Renal Diseases: Statistical Review. P. Shepherd, Newark, N. J.—p. 371.
Importance of Heart Disease: Cardiovascular Situation Today, Present and Probable Future Trends. L. S. Ylvisaker, Newark, N. J.—p. 383.
Diagnosis and Treatment of Heart Wounds: Summary of Thirty-Four Cases. I. A. Bigger, Richmond, Va.—p. 390.
Case Reports by William Stokes of Dublin. W. B. Daniels, Washington.—p. 395.

Missouri State Medical Assn. Journal, St. Louis

37:491-526 (Dec.) 1940

Importance of Water Balance and Electrolytes in Preoperative and Postoperative Care of Surgical Cases. G. W. Post, Chicago.—p. 491.
Cardiology: Review of a Decade. J. Jensen, St. Louis.—p. 494.
Diagnosis of Renal Lesions. I. H. Lockwood and A. B. Smith, Kansas City.—p. 498.
Addison's Disease. R. E. Myers, Joplin.—p. 502.
Meniscus Cyst of Knee Joint. J. Kulowski, St. Joseph.—p. 503.

New England Journal of Medicine, Boston

223:789-834 (Nov. 14) 1940

*Syphilitic Aortitis as Cause of Sudden Death. T. Leary, Boston.—p. 789.
*Instantaneous "Physiologic" Death. S. Weiss, Boston.—p. 793.
*Sudden Death. A. R. Moritz, Boston.—p. 798.
Cancer of Rectum and Sigmoid. W. M. Shedden, Boston.—p. 801.
Some Proposed Changes in the Massachusetts Law as It Relates to Medical Practice. S. Rushmore, Boston.—p. 808.
Acquired Hypersensitivity to Sulfapyridine and Sulfamethylthiazole. A. Davidson and J. G. M. Bullowa, New York.—p. 811.
Regional Anesthesia. A. W. Squires, New York.—p. 813.

Syphilitic Aortitis and Sudden Death.—Leary points out that syphilitic aortitis is today the important form of cardiovascular syphilis seen by the pathologist and that several of its processes tend to lead to sudden death. In syphilitic aortitis there is overstimulation of the essential aortic blood vascular system, the vasa vasorum. With the excessive growth of blood vessels, which penetrate through the media into the intima, there is an excessive growth of fibroblastic tissue, which thickens the intima and tends to narrow and occlude the portions of the coronary arteries lying within the aortic wall. Marked narrowing or occlusion of the ostiums may result in sudden death of the coronary type in the early stages of the disease. In addition to widening of the commissures and rolling of the cusps, atherosclerosis in late syphilitic aortitis tends to be followed by calcification and diffuse dilatation of the aorta, including the ring. Dilatation of the ring produces aortic insufficiency, which may be followed by sudden death of the coronary type but usually leads to late progressive cardiac decompensation. Rupture of aneurysms is also a cause of sudden death, as is the production of local dissecting aneurysms in the lower ascending aorta, with rupture into the pericardium. Experimental atherosclerosis in the rabbit results in late diffuse dilatation of the aorta resembling that found in combined syphilitic aortitis and atherosclerosis in man.

Instantaneous "Physiologic" Death.—Weiss states that in his experience acute structural lesions in vital organs are often meager or absent in cases of instantaneous death. The lesions offered as an explanation of death are usually chronic. Postmortem examination usually fails to reveal proof of or even evidence for the cause of death. Instantaneous death is usually cardiac in origin and depends on an underlying physiologic mechanism. There is a close similarity and interrelation between the mechanism of instantaneous death and syncope; frequently instantaneous death is merely fatal syncope. Thus of 50 patients with aortic stenosis, most of those who suffered from attacks of syncope died instantaneously. Patients suffering from the Adams-Stokes type of syncope may die instantaneously during one of their attacks. The mechanisms of transient and fatal syncope are presumably similar or identical in these cases. Coronary sclerosis, myocardial hypertrophy of arterial hypertension, aortic stenosis and various types of infectious myocarditis or nutritional deficiencies predispose to syncope and to instantaneous death, for in these states the heart has a general tendency to asystole or to cardiac arrhythmias. Such cardiac dysfunction can be induced by the stimulation of various reflexes. Reflex reactions of asystole, auricular fibrillation, bundle branch block and complete auriculoventricular dissociation can be induced. At no time was ventricular fibrillation of reflex origin observed. In the presence of coronary sclerosis there is a tendency to hypersensitivity of the vagal type of carotid sinus reflex as well as of other vagal reflexes. The tonus and activity of the reflexes of the autonomic nervous system vary considerably in normal persons. Under the influence of stress and strain or of disease a remarkable degree of hyperactivity of certain reflexes can develop. This explains why in many persons the effect of emotion or chemical stimuli on the heart and vessels is slight and surgical manipulation of certain nerve structures can be done with safety, while in others alarming seizure or death ensues. The essential difference lies in the ability to reestablish normal equilibrium. The circulation in syncope is influenced markedly by gravity. Hence in the presence of a hyperirritable myocardium the orthostatic position during syncope becomes a serious threat to the patient's life. Thus pleural, pericardial or abdominal tap in patients with myocardial disease is more apt to lead to instantaneous death in a sitting position than in a recumbent one. Patients with an ischemic myocardium or with hyperactive vagal reflexes are apt to die instantaneously during the strain of defecation. Instantaneous death is prone to develop in either young or old after exertion if the vital reflexes and the myocardium are irritable. Instantaneous death may occur during a volatile anesthesia, angina pectoris and coronary thrombosis. In the presence of ischemic myocardium and hyperactive reflexes, fright or other emotional stress may induce cardiac arrhythmia, syncope and death. Although ventricular fibrillation may occur unexpectedly and usually causes syncope, this arrhythmia plays but a minor part in unexpected states of unconsciousness. Asystole occurs more frequently than ventricular fibrillation in the usual types of death due to infectious or degenerative diseases.

Sudden Death.—Moritz discusses sudden death as it pertains to the medical examiner. He divides the cases into three types: instantaneous deaths, unexpected syncope with deepening unconsciousness terminating in death, and rapidly fatal illnesses with early prostration but not ushered in by unconsciousness. In instantaneous deaths, cardiac standstill occurs simultaneously with collapse. Death results from cardiac inhibition and apparently depends on constitutional or acquired neurocirculatory instability. The initiating stimulus may be excitement, fear, anxiety or other intense emotional disturbances. A minor physical injury or the induction of anesthesia may precipitate collapse. The so-called thymicolymphatic death of infants and children may depend on the existence of a hyperirritable cardioregulatory mechanism. Instantaneous death may and occasionally does occur in persons with no recognizable heart disease. In the second type of sudden deaths, minutes or even hours may intervene between syncope and death. Heart disease is usually the cause, and coronary sclerosis with or without thrombosis is preeminent. Any type of developmental, degenerative or inflammatory heart disease may predispose to sudden death. Circulatory failure is the most frequent cause of sudden loss of consciousness terminating in death, but the seizure may result from intracranial disturbances independent of heart failure. Of these, hemorrhage (as in cerebral apoplexy, congenital aneurysm and

brain tumors), either within or around the brain, deserves first consideration. Less common intracranial causes include arterial thrombosis or embolism, meningitis, encephalitis and the sudden development of edema in the vicinity of a tumor or abscess. Diabetic acidosis, uremia and acute adrenal insufficiency are also occasional causes of sudden death. In the third type of sudden death, loss of consciousness is not the first manifestation of the fatal seizure. Disability terminating in death in these cases may progress with such great rapidity that the victim is likely to be found unexpectedly dead in bed. Any of the causes already described may operate in this manner. Fulminating infection, particularly in the very young or the very old, is likely to progress with such rapidity that the entire clinical course of the disease may occur within a few hours. Many unexpected deaths of young infants attributed to suffocation or to status thymicolymphaticus are actually due to infection. It is not unusual for an old person thought to be well in the evening to be found dead in bed the next morning as a result of bronchitis, pneumonia or peritonitis. In such circumstances circulatory failure undoubtedly plays an important part. Hemorrhage is another cause of unexpected prostration progressing rapidly to death. Fatal bleeding into the pleural, peritoneal cavity or into the lumen of the intestine, aneurysm, tumor, varix, ulcer and ectopic pregnancy are common causes of a concealed fatal hemorrhage. The entrance of a few ounces of blood into the air passages may cause the victim to drown in his own fluid. Common causes of intrabronchial bleeding include aortic aneurysm, tumor, abscess and tuberculosis of the lungs. The medical examiner must decide which cases of sudden or obscure death shall be investigated, so that deaths from unnatural causes shall not be overlooked.

Pennsylvania Medical Journal, Harrisburg

44:129-256 (Nov.) 1940

Complications Incident to Paranasal Sinusitis. F. W. White, New York.—p. 141.
Diabetes: VII. Management of Pregnancy in Diabetes. R. D. Porter, Jenkintown.—p. 148.
Tularemic Pneumonia: Its Recognition and Prevention. H. B. Thomas, York.—p. 151.
Basal Metabolic Rate in Various Diseases. E. R. Janjigian, Danville.—p. 157.
Primary Acute Pneumococcic Peritonitis: Report of Case Treated with Sulfapyridine. N. C. McCollough, Butler.—p. 159.
*Comparison of Therapeutic Agents in Treatment of Scarlet Fever. P. F. Lucchesi and B. B. Stein, Philadelphia.—p. 162.
Law and Lunacy. B. L. Keyes, Philadelphia.—p. 165.
Pneumococcic Meningitis with Reference to Sulfapyridine Therapy. D. Turnoff, E. B. Marenus and T. G. Schnabel, Philadelphia.—p. 172.
*Rocky Mountain Spotted Fever in Southeastern Pennsylvania. W. P. Havens, C. G. Whitbeck and Cecelia G. Kramer, Philadelphia.—p. 176.
Mechanism of Postmetrazol Gibbus. T. K. Rathmell, Norristown.—p. 180.
Cardiac Thrombi Complicating Mitral Stenosis with Pulmonary Tuberculosis in a Miner. S. C. Stein, White Haven, and J. F. Giering, Wilkes-Barre.—p. 183.
Diagnosis and Treatment of Pelvic Endometriosis. F. L. Payne, Philadelphia.—p. 186.
Clinical Uses of Paredrine Hydrobromide in Eye. I. S. Tassman, Philadelphia.—p. 191.
Neurologic Problems Past Fifty. M. T. Moore, Philadelphia.—p. 195.
Evaluation of Biologic Products in Treatment of Pertussis. P. F. Lucchesi and N. Gildersleeve, Philadelphia.—p. 202.
Bladder Neck Obstruction in Female. W. Baurys, Nanticoke.—p. 206.

Therapeutic Agents for Scarlet Fever.—Lucchesi and Stein compared the effect on fever and complications of four types of treatment given 1,780 patients with scarlet fever. Five hundred and nineteen patients, 164 of whom were mildly and 355 moderately ill, were treated symptomatically and served as controls. Of the remaining patients 581 (12 mildly, 251 moderately and 318 severely ill) received scarlet fever antitoxin, 492 patients (in 53 of whom the disease was mild, 321 moderate and 118 severe) were treated with foreign protein (diphtheria antitoxin) and 188 patients (20 were mildly, 105 moderately and 63 severely affected) were given convalescent scarlet fever serum. The patients given the antitoxin had the shortest period of fever, five and forty-nine one-hundredths days as compared to six and four-tenths days for the control group and six and six one-hundredths and seven and one-tenth days respectively for those receiving foreign protein and convalescent serum. The highest complication rate, 23.94 per cent, occurred among the patients receiving convalescent serum; the rates for the other three groups were respectively 17.73, 20.65 and 21.95 per cent. The figures indicate the average complication rate for mild, moderate and severe cases. For the moderately ill patients the highest complication rate (21.13 per cent) occurred among the control group and the lowest (17.53 per cent) among those receiving antitoxin. Otitis media and adenitis were the most frequent complications in all four groups. The incidence of serum disease for the patients receiving antitoxin was 38.7 per cent and for those given foreign protein 28.02 per cent. The difference is probably due to the larger volume of scarlet fever antitoxin given with each therapeutic dose. The use of ephedrine and ephedrine and calcium for the prevention of serum disease had no beneficial effect on the patients treated with antitoxin; the incidence was even higher among those receiving the drugs. Patients receiving foreign protein experienced a negligible response from ephedrine and calcium and a moderate response from ephedrine.

Rocky Mountain Spotted Fever in Pennsylvania.—According to Havens and his associates, spotted fever is at present endemic in at least forty-two of the forty-eight states, and since 1931 it has been reported in twenty-six of the Central and Eastern states. Although its recognition in the East has been recent, it is now believed that spotted fever has been endemic in the Eastern and Central states as long as in those farther west. During the spring and summer of 1939, 13 cases occurred within 30 miles of Philadelphia. Exact data could not be obtained in most of them, and it is uncertain whether each actually was a case of spotted fever. However, many more cases may have occurred but because of their mildness were not detected or reported. Because of the widespread interest in the disease the authors attempted to determine roughly what percentage of ticks in the environs of Philadelphia harbor the infection. As recent engorgement of blood is required to reactivate the virus, engorged ticks were collected by volunteers from dogs roaming the woods and fields. Eighteen lots of material from four hundred ticks obtained from eighteen different localities were injected into sets of 2 guinea pigs each. Only 1 lot appeared to be infected with the causative rickettsia, which represents approximately the proportion of infected ticks found by others elsewhere. Because of this apparently low rate of infectivity the authors feel that there need be no undue alarm over the contagion of spotted fever in the spring or summer months, provided reasonable care is taken to keep ticks off the body. Engorged ticks should not be plucked from animals without adequate precaution. They believe that the presence in Pennsylvania of a form of spotted fever different from that found in the West argues against the belief that the disease was brought here by cattle or rabbits transported from the West. Evidence favors the view that the disease is perennially endemic wherever rodents and ticks reside.

Philippine Medical Association Journal, Manila

20:441-504 (Aug.) 1940

Regional Ileitis (Crohn's Disease): Case Report. A. Liboro and D. E. Nieva, Manila.—p. 441.
Pathologic Report of Case of Regional Ileitis. L. Gomez, Manila.—p. 449.
Comparative Study of Some Treatments of Inflammation of Maxillary Antrum. C. D. Ayuyao, C. V. Yambao and P. Simuangco, Manila.—p. 451.
Blood Pressure of Filipino School Children. Isabel Ferrer, Manila.—p. 457.
Cerebral Type of Malaria: Report of Case. M. Quisumbing Sr., San Pablo, Laguna.—p. 461.
Sulfapyridine in Treatment of Pneumococcic Pneumonia. A. H. Rivera and Andrea Naguiat, Del Carmen, Pampanga.—p. 465.

20:505-566 (Sept.) 1940

Chronic Appendicitis: Study of Its Clinical and Pathologic Diagnosis. J. R. Estrada and S. C. Meñez, Manila.—p. 505.
New Light on Anthelmintic Action of Santonin from Experimental Standpoint. R. Guevara, A. J. Damian and V. Uyenco, Manila.—p. 513.
Role of Ophthalmology and Otolaryngology in Solution of Some Problems of Internal Medicine. G. de Ocampo, Manila.—p. 523.

Physiological Reviews, Baltimore

20:469-616 (Oct.) 1940

Mechanism of Acquired Immunity in Infections with Parasitic Worms. W. H. Taliaferro, Chicago.—p. 469.
Pituitary-Adrenocortical Relationship. H. G. Swann, Chicago.—p. 493.
Recent Advances in Chemistry of Calcification. M. A. Logan, Boston.—p. 522.
Fat Absorption and Its Relationship to Fat Metabolism. A. C. Frazer, London, England.—p. 561.
Fluoride Intoxication. D. A. Greenwood, Chicago.—p. 582.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Dermatology and Syphilis, London

52:289-320 (Oct.) 1940

Generalized Scleroderma and Dermatomyositis: Histologic Comparison. W. Freudenthal.—p. 289.
Biochemical Aspects of Dermatomyositis. W. J. Griffiths.—p. 295.
Reticuloendotheliosis and Normoblastosis. F. S. P. van Buchem and T. Botman.—p. 304.

British Journal of Ophthalmology, London

24:541-580 (Nov.) 1940

Metastatic Carcinoma of Iris: Clinically Simulating Gumma. H. B. Stallard.—p. 541.
Trachoma (Some Experimental Data with Clinical Interest from Records of Combined Etiologic Investigation by Various Members of the Government Ophtnalmic Hospital, and the King Institute of Preventive Medicine, Madras, 1935, 1936, 1937). R. E. Wright.—p. 547.
Preliminary Note on Use of Retrobulbar Proctocaine Anesthesia for Relief of Intractable Ocular Pain. L. H. Savin and T. M. Tyrrell. —p. 560.
Convergence Weakness. O. G. Morgan.—p. 564.
New Knife for Doing Van Millingen's Grafting Operation. S. Kamel. —p. 567.

British Journal of Radiology, London

13:357-392 (Nov.) 1940

Action of Radiations Emitted by (1) Radium Plaques, (2) Unfiltered and Filtered Radon Seeds and (3) Intravenous Injection of Radon Dissolved in Blood. A. Eidinow.—p. 357.
Some Experiments on Biologic Effects of Fast Neutrons. L. H. Gray, J. C. Mottram, J. Read and F. G. Spear.—p. 371.
Note on Dosage Data for Radium Therapy. T. H. Oddie.—p. 389.

British Medical Journal, London

2:545-582 (Oct. 26) 1940

*Diagnostic Value of Pregnandiol Excretion in Pregnancy Disorders. C. L. Cope.—p. 545.
Effect of Repeated Intravenous Injections of Bilirubin on Erythropoiesis in Anemic Dogs. R. R. Bomford.—p. 549.
Dual (Kiss) Cancer of Stomach: Case. E. W. Thomas.—p. 552.
Psychiatric Casualties in London, September 1940. G. Pegge.—p. 553.
*Treatment of Anemia by Transfusion of Concentrated Suspensions of Red Cells. D. H. G. MacQuaide and P. L. Mollison.—p. 555.

Diagnostic Value of Pregnandiol Excretion.—Cope determined the pregnandiol excreted in the urine of 100 pregnant women presenting various pregnancy disorders. The significant figure is not the concentration of pregnandiol but the total excretion in twenty-four hours. In the first few months of pregnancy, estimation of pregnandiol excretion can be of value in the diagnosis of pregnancy and its absence as evidence of a serious abnormality. Demonstration in a case of amenorrhea is strongly suggestive of pregnancy, for no other condition is so far known in which the two are associated. However, it must be certain that the pregnandiol excretion is not the normal prelude to an oncoming menstruation. To be of value, estimations must be capable of detecting as little as 3 mg. in the whole twenty-four hour output. Absence of pregnandiol from the urine of a woman with signs or symptoms of threatened abortion is evidence of abnormality, and the determination should be repeated. If persistently absent, either abortion is inevitable, the products of conception have been already partially or completely evacuated or the fetus has died without expulsion, missed abortion. Distinction between these possibilities must be made by clinical means. Treatment of threatened abortion with no pregnandiol excretion is not complete until it is certain that the uterine contents have been evacuated or definite evidence is obtained that the fetus is alive. The latter alternative occurs infrequently. As pregnandiol is believed to be derived from the placenta rather than the fetus, its excretion can be expected to continue when fragments of placental tissue are retained. In 1 of 6 cases of incomplete abortion with symptoms sufficient to require hospitalization, a doubtful trace of pregnandiol was found. Usually the retained fragments are either too small or too damaged to provide pregnandiol in recognizable amount. This may be influenced by the time elapsed since abortion. When intra-uterine death is suspected on clinical grounds absence of pregnandiol from the urine supports the diagnosis, but the converse (as in incomplete abortion) is not always true. If fetal death is suspected and pregnandiol is found in the urine the estimation should be repeated at weekly intervals. A progressive fall is suggestive, and if the excretion falls to zero the evidence is almost conclusive. Pregnandiol excretion provides information comparable to that of the Aschheim-Zondek and Friedman tests. Chronic nephritis and toxemia of pregnancy may interfere with pregnandiol excretion. Deviations from the normal excretion in these conditions do not necessarily mean that the gestation is abnormal. Pregnandiol excretion seems assured of a place as a diagnostic aid in obstetric disorders, but further study is necessary for establishing its significance.

Transfusion of Concentrated Suspensions of Erythrocytes for Anemia.—Sixty-one patients with anemia were treated by MacQuaide and Mollison with an erythrocyte concentrate. The results suggest tentative conclusions as to the advantages of such therapy. Hypertonic saline solution was used as a diluent for the erythrocyte suspension because it produced less hemolysis than physiologic solution of sodium chloride. Hemolysis was further reduced by adding 8 per cent dextrose, insuring a concentration of dextrose of at least 1 per cent in the final mixture. Hypertonic saline solution is necessary presumably because the citrate saline into which the blood is originally taken is hypertonic and cells stored with this fluid become hypertonic to physiologic solution of sodium chloride. Very few reactions were encountered, suggesting that the leukocyte gel is responsible for the reactions following whole blood transfusions. In the preparation of the concentrated suspension, infection must be avoided. The cell suspension may be given (as soon as possible after preparation) through an ordinary administering apparatus. If the leukocyte gel is not removed, it is advisable to use a gas mantle or some other type of filter. The suspension was not warmed before administration. One bottle of the cell suspension, that is the cells of two bottles after plasma has been removed, usually raises the hemoglobin approximately 10 to 15 per cent. Thus, in one case, following a transfusion of six bottles of the cell concentrate the hemoglobin rose from 26 to 90 per cent and the erythrocytes from more than one million to more than five million per cubic millimeter. The use of the concentrated suspension is contraindicated in shock, in which the immediate need is to restore blood volume rather than to increase the number of erythrocytes. The incidence of rigors among the 61 cases was 6.5 per cent, in contrast to 22 per cent among 45 cases in which transfusions of whole stored blood were used.

Journal of Laryngology and Otology, London

55:361-404 (Aug.) 1940

Paranasal Approach to Intrasellar Tumors. F. R. Nager.—p. 361.
Bleeding from Tonsils Caused by Lack of Hormone. N. Viola.—p. 382.
Aspiration Through Tympanic Membrane. H. M. Jay.—p. 385.

Lancet, London

2:475-506 (Oct. 19) 1940

*Adherent Pericardium: Constrictive and Nonconstrictive. T. G. Armstrong.—p. 475.
True Chylous Pleurisy: Report of Case. H. A. Cookson and D. A. Slade.—p. 477.
Blast from High Explosive: Preliminary Report on Ten Fatal Cases. G. Hadfield, R. H. A. Swain, Joan M. Ross, J. M. Drury-White and A. Jordan.—p. 478.
Alcohol Injection of Gasserian Ganglion for Migrainous Neuralgia. W. Harris.—p. 481.
Management of Cerebrospinal Fever Treated with Sulfapyridine. D. Williams and D. Brinton.—p. 482.
Sulfathiazole in Malaria. R. Pakenham-Walsh and A. T. Rennie.—p. 485.
Androgen and Pregnandiol Excretion in Hypertrichosis. R. Greene.—p. 486.
Influenza Virus and Incidence of Primary Lung Tumors in Mice. J. A. Campbell.—p. 487.
Bullet in Heart for Twenty-Three Years. G. G. Turner.—p. 487.
Bronzed Diabetes in a Woman. R. D. Lawrence.—p. 489.

Adherent Pericardium.—Armstrong calls attention to a diversity of opinion as regards the effects on the heart of an adherent pericardium. The following beliefs have been held: 1. That it may cause a cardiac failure characterized by a small heart associated with edema and ascites. 2. That it may have

no effect at all. 3. That it may cause failure with enlargement of the heart. In the light of modern knowledge the first two are undoubtedly correct, the third is unproved, and there is considerable evidence to show that it is untrue. An investigation was made into the histology of the pericardium in cases taken from the series of 114 necropsies at which complete adherence of the pericardium had been found; 4 cases of cardiac compression from which the pericardium had been removed at operation were added. The cases were divided into two groups: (1) adherent pericardium associated with chronic compression of the heart, the "constrictive" group, and (2) adherent pericardium without cardiac compression, the "nonconstrictive" group. It appeared that in constrictive pericarditis the compression of the heart depended on the type of fibrous tissue present, on its thickness, density and situation. The microscopic picture in the two groups showed that the density and toughness of the fibrous tissue is the deciding factor in producing cardiac compression. It also explains the success of pericardectomy. The removal of an adherent pericardium will lead to further adhesions in healing, but the peculiar fibrous tissue which compresses the heart does not repeat itself. When adhesions form, they have no effect on the heart. The different microscopic appearances in the two groups suggest also a difference in etiology and explain the widely held view that cardiac compression never follows a rheumatic pericarditis. On pathologic grounds as well as clinical, rheumatism can be excluded from the etiology of constrictive pericarditis. It has been known to be tuberculous and in some cases it has probably resulted from an unrecognized septic pericarditis. The author concludes that adherent pericardium may lead to cardiac failure associated with a small heart (constrictive type) or may have no effect on the heart at all (nonconstrictive type). There is no evidence that it causes enlargement of the heart unless it is accompanied by valvular or other cardiovascular disease.

Medical Journal of Australia, Sydney

2:331-362 (Oct. 12) 1940

Laryngeal Obstruction in Childhood. F. Arden.—p. 331.
Microtomy of Eye. K. O'Day.—p. 336.
Diagnosis of Malignant Disease. G. M. Oxer.—p. 338.
Treatment of Meningitis Due to Meningococcus, Haemophilus Influenzae, Pneumococcus and Streptococcus. D. G. Hamilton.—p. 342.

2:363-394 (Oct. 19) 1940

*Some Observations on Changes in Mineral Content of Plasma and Serum. B. Splatt.—p. 363.
Effect of Testosterone Propionate on Pouch, Scrotum, Clitoris and Penis of Trichosurus Vulpecula. A. Bolliger and A. Carrodus.—p. 368.
Relative Error in Examining Swabs for Corynebacterium Diphtheriae by Löffler Slope and by Clauberg Plate. H. Wilson.—p. 373.

Changes in Mineral Content of Plasma and Serum.—Splatt studied the changes in the plasma during the storage of blood and compared the serum obtained from individuals before and after hemorrhage and before and after transfusion with stored blood or serum. The alterations in the potassium, sodium, calcium, magnesium and chloride content of the plasma during the storage of blood show that a rapid rise in the potassium content of the plasma takes place as soon as the blood is placed in the anticoagulant solution. In citrate saline solution there was a 43 per cent increase of potassium at the end of seven hours, and at the end of twenty days the plasma contained 363 mg. of potassium per hundred cubic centimeters. In dextrose citrate solution the increase was 74 per cent at the end of seven hours and 305 per cent at the end of twenty days. In the sodium citrate and chloride solution of Manzells and Whitaker an increase of 71 per cent was obtained in seven hours, rising to 860 per cent at the end of the experiment. In their dextrin solution though the increase in seven hours was 10 per cent at the end of twenty days it was 520 per cent. The alteration in the potassium content of the plasma takes place long before the onset of hemolysis. In all four solutions there was a fall in the sodium content of the plasma during storage; this was greatest with the citrate saline solution and least with the citrate chloride solution. The fall commenced as soon as the blood was mixed with the anticoagulant. The fall was independent of the onset of hemolysis. The changes in the calcium content of the plasma of the stored blood were irregular. In the blood preserved with the first three anticoagulants there was a steady increase; in that preserved with the dextrin solution there was a preliminary fall followed by a rise at the end of thirteen days. Magnesium was estimated in the plasma of only 2 donors and the changes observed were also irregular. There was a fall in the chloride content of the plasma with all four preserving solutions. Hemolysis was slightly less in the blood preserved in the dextrose citrate and dextrin solutions. It appears that these two solutions have some advantage over the other solutions as there was only slight hemolysis at the end of thirteen days. The changes in the mineral content of the plasma justify the view that during storage the stroma of the erythrocytes ceases to be semipermeable and allows diffusion to take place between cells and plasma. Equilibrium is not usually reached before hemolysis occurs. The mineral content of serum was studied after loss of 1 pint (500 cc.) of blood by venipuncture in healthy subjects and hemorrhage occurring as a result of disease or accident. The serum of 23 normal adults after a fat-free breakfast was examined to establish values for comparison. The serum from these samples demonstrated no significant change in any of the mineral constituents. The average values for potassium, sodium, calcium and magnesium found in serum from 11 patients following severe hemorrhage and 1 patient after a moderate hemorrhage were similar to those of normal adults. Study of the mineral constituents of serum after the intravenous injection of stored blood (in 3 cases) and of stored serum (in 8 cases) showed no significant change in any of the constituents following stored blood transfusion. In none of the 8 given stored pooled serum was there any significant change in the potassium content of the serum, though obvious alterations in the level of sodium, calcium and chloride did occur. The 11 cases illustrate that in man serum or blood with a high potassium content, given at the rate of 500 cc. an hour, causes no ill effects or any significant change in the serum potassium level of the recipient. On the other hand, differences between the sodium and calcium in the transfused fluid and that in the recipient's blood before transfusion are sometimes reflected in a corresponding alteration in the amounts of these substances found in the recipient's serum after transfusion. The absence of toxic effects after the large doses of potassium in stored blood or serum is attributed to the presence of sufficient amounts of neutralizing sodium ions in them and to the slow rate of transfusion.

Practitioner, London

145:213-308 (Oct.) 1940

Medicine. H. Moore.—p. 213.
Surgery. R. Kelly.—p. 221.
Midwifery and Gynecology. A. Bourne.—p. 231.
Tropical Diseases. P. H. Manson-Bahr.—p. 238.
Diseases of Children. A. Moncrieff.—p. 244.
Allergy. G. W. Bray.—p. 249.
Diseases of Skin. P. B. Mumford.—p. 258.
Venereal Disease. R. C. L. Batchelor.—p. 263.
Psychologic Medicine. T. M. Ling.—p. 269.
Recent Advances in Anesthesia. R. R. Macintosh.—p. 275.
War Injuries of Eye and the General Practitioner. H. M. Traquair.—p. 282.
Some Physiologic Aspects of the Present War. H. Hartridge.—p. 289.
Modern Therapeutics: XVI. Some Modern Disinfectants and Antiseptics. C. H. Browning.—p. 293.

145:309-372 (Nov.) 1940

Tonsils and Adenoids. L. Barrington-Ward.—p. 309.
Common Winter Disorders of Nose and Throat Among Services Under War Conditions. H. V. O'Shea.—p. 316.
Epistaxis. H. V. Forster.—p. 325.
Some Common Diseases of Larynx. F. C. Ormerod.—p. 330.
Treatment of War Wounds. W. H. Ogilvie.—p. 337.
Emergence of an Unsuspected War Neurosis. C. Berg.—p. 345.
New Methods of Blood Examination. Janet M. Vaughan.—p. 349.
Surgical Aspects of Peptic Ulceration. H. Dodd.—p. 355.
Modern Therapeutics: XVII. Cholagogues and Drugs Acting on Liver. C. Newman.—p. 361.

South African Medical Journal, Cape Town

14:371-390 (Oct. 12) 1940

Individuality of the Blood, with Some Observations on Its Medicolegal Significance. I. Gordon.—p. 371.
Medicolegal Significance of Blood Grouping. L. P. Bosman and W. P. Mulligan.—p. 373.
Poisoning by Arsenic in South Africa. P. R. v. d. R. Copeman and P. A. E. Kamerman.—p. 379.
Hereditoconstitutional Research in Psychiatry. L. A. Hurst.—p. 384.

Presse Médicale, Paris

48:585-600 (June 11) 1940

Abortive Latent Tuberculosis and Tuberculous Reinfection. P. Ameuille, A. Saenz and G. Canetti.—p. 585.
*Antidiphtheria Vaccination in the Army. F. Meersseman and M. Hulin. —p. 589.
Cullen's Sign: Case. C. Olivier.—p. 593.
Blood Group Determination: Beth-Vincent Test. P. Theil.—p. 594.

Antidiphtheria Vaccination in Army.—According to Meersseman and Hulin, the morbidity rate for diphtheria fell rapidly in army units after the law of 1936, tightening the provisions of the law of 1931 and making toxoid prophylaxis universally compulsory for the army, was applied. (The law of 1931 had been limited to Schick-positives stationed in localities known as endemic centers of diphtheria.) In the garrison of Briançon, with a complement of 2,500 men in an endemic geographic area, the application of the law of 1931 had reduced the disease incidence from 40 to 13, only to see a striking exacerbation during the three succeeding years (69, 89, 40). On the introduction of universal military vaccination, morbidity fell to 4 cases in 1937 and 2 in 1938. In the garrison of Grenoble, numbering 4,000 men, limited vaccination lowered a previously high incidence of 111 to 50, 16, 14 and 13 cases for the respective years. When the regulations of the law of 1936 were applied, the diphtheria rate fell at once to 4, 5 and 2 cases. In the garrison of Lyons with 10,000 men, a diphtheria incidence which was still high in 1932 (112 cases) descended to a level of 4 and 3 cases in 1937 and 1938. The endemiologic analysis for the fourteenth military region, totaling 32,000 men, which in 1932 still showed a diphtheria incidence of 319 cases, fell to 69, 25 and 18 cases, respectively, for the years 1936, 1937 and 1938, with no deaths. Similarly, a comparison of the diphtheria frequency for both the civilian (not subject to compulsory vaccination) and the military population of Lyons, which in 1932 showed a ratio of 410 against 112, in 1936, 1937 and 1938 exhibited the contrast of 410 to 7, 465 to 4 and 276 to 3. According to the authors the cumulatively favorable evidence for compulsory antidiphtheria vaccination was not weakened by such secondary renal and hepatic sequels as appeared. These were for the most part temporary and mild. Failure to attain a perfect score in diphtheria eradication is attributed to incomplete or interrupted vaccination, exemptions allowed and so on. In cases in which the disease appeared in spite of correct and complete vaccination, estimated at from 0.3 to 0.5 per cent of all army vaccinations, the authors observed many atypical and mild forms that frequently failed to react positively to the Schick test. Antidiphtheria therapy in the surveys here reported was associated almost from the beginning with typhoparatyphoid inoculation and since 1936 has been combined with antitetanus antitoxin. The statistical data cover the years 1926 to 1938.

Annales Pædiatrici, Basel

155:305-368 (Sept.) 1940

New Form of Acute Dementia in Childhood. J. König and I. Zimányi. —p. 305.
*Therapeutic Experiences with Vitamin K. F. Hauser.—p. 325.
Want of Appetite in Childhood. J. Surányi.—p. 345.

Vitamin K Therapy.—Hauser reports favorable results obtained with vitamin K in hemorrhagic disease of the newborn. Vitamin K stimulated prothrombin action even in a case (age of child 4 days) terminating fatally in which, at necropsy, the gallbladder and bile ducts were found in a rudimentary stage of development. In another case (age of child 4 days) in which vitamin medication failed completely, necropsy disclosed a ruptured tentorium cerebelli. In a case of atresia of the bile duct, vitamin K made surgical intervention possible; in a case of stenosis of the bile ducts, the bile in the blood was seen to improve. Vitamin K was beneficial also in thrombasthenia associated with grave hemorrhagic diathesis. Coexistence of thrombopenia and hypocalcemia may have an adverse effect on the vitamin therapy and requires the cooperation of blood transfusions and calcium injections. Banked blood, however, is not suitable for transfusion in hemorrhagic diathesis, as it loses prothrombin rapidly. Microdetermination in the prothrombin count was made by a modification of the Quick-Kato-Fiechter method. In this the use of carefully decalcified mother's milk proved an effective thrombokinase. Vitamin K administered in suitable daily doses for six days to 6 normal children demonstrated no effect on the fibrinogen content of the plasma.

Schweizerische medizinische Wochenschrift, Basel

70:925-944 (Sept. 28) 1940

*Prophylaxis of Goiter in the Newborn. H. J. Wespi.—p. 925.
Experiences and Results in Traumatic Rupture of Urinary Bladder. W. Brunner and H. Kübler.—p. 928.
Treatment of Dyspepsia in Nurslings with Dry Apple-Banana Powder. Anna Botsztejn-Wyszewianska.—p. 932.
Diuretic Action of Prostigmine. W. Bachmann.—p. 935.

Prophylaxis of Goiter in the Newborn.—According to Wespi, iodine prophylaxis in the form of iodized salt was introduced in 1922 in a certain region in Switzerland where goiter was endemic and 50 per cent of the newborn had enlarged thyroids. This prophylactic measure greatly reduced the incidence of goiter in the newborn but did not bring about its complete disappearance. Eggenberger therefore introduced additional individual prophylaxis in pregnant women. They were given a stock mixture which increased the iodine content of the salt used in their household for from three to four times that of ordinary iodized salt. These measures resulted in the reduction of the incidence of struma in the newborn to 5.3 per cent. The iodine provided in iodized salt may not be adequate for pregnant women who are obliged to restrict their salt intake in order to avoid toxicosis. In such cases medication with potassium iodide can be resorted to. The author emphasizes that the reduction in the incidence of goiter is dependent on the quantity of iodine given in addition to that provided by the food. If during the last weeks of pregnancy the daily addition amounts to approximately 150 micrograms of potassium iodide, no measurable enlargement of the thyroid is evident in the nursling. If this quantity of iodine is administered during the last three months of pregnancy, enlargement of the thyroid is not even perceptible. The unequivocal results of the prophylaxis and the knowledge of the quantities of iodine ingested in regions where goiter is not endemic corroborate the correctness of the iodine deficiency theory of goiter. Since the present degree of iodization of cooking salt does not prevent the struma in the newborn in all cases, it should be increased so that each kilogram of salt contains at least 10 mg. of potassium iodide. This form of prophylaxis involves no danger since the small physiologic quantities of iodine do not cause existing strumas to become toxic.

Archiv für Kinderheilkunde, Stuttgart

120:49-112 (June 29) 1940

*Prophylaxis of Rickets. K. Hofmeier.—p. 49.
Lactic Acid Bacterial Flora Occurring in Small Intestine of Nurslings. W. Goeters.—p. 60.
Temporary Cardiac Murmurs in Nurslings. A. Meier.—p. 89.
Excretion Urography by Means of Subcutaneous Injection During Childhood. J. Siegl.—p. 94.
Otitis Media—An Initial Symptom of Pneumonia. H. W. Görges.—p. 100.
Action of Estrogen on Hemopoiesis. Maria Várady.—p. 104.

Prophylaxis of Rickets.—According to Hofmeier the German organization for the protection of nurslings and young children, realizing the high incidence of rickets in Germany, particularly in some industrial regions, demanded a general prophylaxis, which is now being carried out. The health departments invite the mothers to bring their infants to a station where the nurslings are examined and the mothers are given a supply of irradiated ergosterol in oil with the instruction to give the nursling 5 drops of the oil daily. The first examination is made when the nurslings are in their third month of life. The supply of the irradiated ergosterol lasts about two months, at the end of which time the infants are reexamined and a new supply is furnished. At the end of this period the nurslings are examined for the third time. If at one of the examinations signs of rickets are detected, the nursling is referred to the family physician or to the insurance physician. In order to make certain that the prophylaxis is properly carried out, a nurse calls on the mother two or three weeks after the first supply of irradiated ergosterol has been given. Under unfavorable social conditions or when it is difficult to obtain cooperation from the mother, the prophylaxis can be carried out in the form of the so-called vitamin thrust, which consists in giving the nursling a single large dose (up to 15 mg. of vitamin

D_2). This is sufficient to protect the infant for from four to six months. As a rule the prophylaxis is begun without consideration for the season of the year. In climatically favorable regions the treatment may be interrupted during the months of July and August. Early fruit and vegetable feeding and sufficient exposure to light and air are urged. In many children the prophylaxis of rickets has to be repeated during the second winter.

Medizinische Welt, Berlin

14:341-368 (April 6) 1940

*Pathologic-Anatomic Effects of Poison Gases Employed in War. J. Wätjen.—p. 341.
Lymphatic Reactions: C'cn. G. Holler.—p. 344.
Epilepsy in Children. E. Müller.—p. 348.
Seminal Examinations and Sterile Marriages. W. Stemmer.—p. 351.
Pseudocavities. P. Sibbel.—p. 354.

Effects of Phosgene and Dichlordiethyl Sulfide.—According to Wätjen, phosgene and dichlordiethyl sulfide (mustard gas) have a distinctively different pathologic-anatomic toxicity. Phosgene, on inhalation, exerts a toxic effect within the area of the lungs by damaging the parenchyma of the lungs. It also modifies the blood picture. In concentrated doses it provokes acute asphyxia. In weaker concentrations it induces pulmonary edema associated with circulatory dysfunction. Distant extrapulmonary effects are not due to the absorptive power of phosgene but to the increased viscosity of the blood and the consequent retardation of the circulation. Patients who survive acute suffocation or pulmonary edemas may succumb to secondary infections, which produce localized pneumonia, chronic bronchitis and bronchiolitis obliterans, or they may suffer from bronchiectasis and emphysema years after the exposure. On the other hand, dichlordiethyl sulfide is a treacherous gas in that it does not manifest its toxicity until after a latency of several hours. It affects particularly the upper respiratory passages, damages both exposed and protected skin surfaces by completely necrotizing exposed skin and mucous membrane surface and by attacking the blood vessels, especially the capillaries. Unlike phosgene, it is strongly absorptive, affects the entire metabolic system, induces blood degeneration and damages the hemopoietic organs, such as the bone marrow. Cases in which the gas is inhaled in vapor form present a particularly grave evolution. The upper respiratory passages undergo serious alterations that may lead to secondary lung changes and end fatally. At necropsy, pronounced hemosiderosis is observed in the spleen and liver.

Monatschr. für Ohrenheilkunde, Berlin

74:155-200 (April) 1940

Necrosis of Vocal Cord in Panmyelophthisis. F. Angyal.—p. 155.
Epulis Laryngis: Case. E. Wessely.—p. 158.
Grave Pharyngeal Phlegmon After Tonsillectomy in Local Anesthesia: Case. K. Kofler.—p. 162.
*Nasal Furuncles. F. J. Mayer.—p. 167.

Nasal Furuncles.—According to Mayer, conservative therapy, valuable in certain stages of nasal furuncles, should promptly yield to surgical intervention when bacterial invasion has spread from the nose to the inner orbital region and threatens to evolve into thrombosis of the cavernous sinus. A description of the operation, for which no originality is claimed, is given. Experience with 4 desperate delayed cases in which death was due to sinus thrombosis led the author to intervene surgically in 3 other cases with successful issue. His case material covers 91 patients, 64 of whom were men, treated during the course of ten years. The greatest incidence of nasal furuncles occurred during the third and fourth decades, with the seasonal trend highest during July and August. The ala nasi was affected thirty-four times, the tip of the nose twenty-nine and the nasal opening twenty-eight times. Among facial furuncles nasal furuncles, especially the ala nasi, are the most dangerous because of their medial position and the relation in anatomic structure between the nasal membrane and the cartilage. Complications ending fatally are due principally to generalized bacterial infection or to cavernous thrombosis. Hence prognosis is doubtful. Thrombosis in the cavernous sinus travels by way of the vena angularis and the vena ophthalmica to the sinus cavernosus, from which general infection as well as local invasion of the meninges may occur. The author discusses the relative merits and suitability of conservative and surgical procedures. When tissue destruction and abscess formation have already set in, short wave therapy was found effective. In somewhat more advanced cases with no tissue destruction, alcohol applications or Burow's solution were beneficial, especially when lips, cheek and eyelid were collaterally involved. Vitamin C was used only in cases of serious vitamin C impairment. Early diagnosis and prevention of complications controlled the author's therapeutic purpose.

Acta Path. et Microbiol. Scandinavica, Copenhagen

17:255-376 (No. 3) 1940

Serologic Analysis of High Molecular Crystallizable Protein in Myeloma Serum. T. Packalén.—p. 263.
Immunity to Negatactic Substance of Bacteria. A. Pettersson.—p. 273.
Relation of Hydrogen Ion Concentration to Disinfecting Power and Effect of Addition of Neutral Salts, with Special Consideration of Conditions in Physiologic Milieu. O. Ornstein.—p. 286.
*Rheumatic Fever Subsequent to Some Epidemics of Septic Sore Throat (Especially Milk Epidemics). T. Madsen and K. Kalbak.—p. 305.
Pituitary Transplants in Rats. A. Westman and D. Jacobsohn.—p. 328.
Dimensions of Villous Surface of Full Term Human Placenta: Relation to Permeability. A. K. Christoffersen.—p. 348.

Rheumatic Fever.—In view of the increasing tendency to associate rheumatic fever with sore throat produced by streptococci, Madsen and Kalbak review the experiences from some relatively well investigated angina epidemics in Denmark. Their study involves two fairly recent milk epidemics and the data obtained from several older epidemics found in reports from the Danish National Health Service. During the angina epidemic in Kolding of December 1926, about 2,500 of the inhabitants were attacked by a severe form of sore throat that in many cases assumed the form of phlegmonous angina. Notification was made by December 31 of 840 cases under medical treatment, including several with complications. The ascertained complications were 96 cases of phlegmon and abscess of the pharynx, 47 of otitis media, 33 of erysipelas of the face, 30 of rheumatic fever, 5 of laryngeal abscess and 2 of phlegmon of the tongue. The articular symptoms in the 30 patients with rheumatic fever made their appearance in from one to five weeks after the onset of sore throat, most often after a period during which the patients thought they were well, even though several of them still had some tiredness, lassitude and vague discomfort in various parts of the body. After such an interval they were taken suddenly ill with fever and joint pains, and gradually they had all the symptoms of typical rheumatic fever. The points to be emphasized are that the 30 patients were infected with hemolytic streptococci, that they previously had an attack of angina, that there was a symptom-free interval between the angina and the rheumatic fever and that only 3 of the 30 patients had a history of rheumatic fever. After the primary attack of rheumatic fever subsequent to the angina 9 patients suffered one relapse, 4 had two relapses and 1 had three relapses. The other recent milk epidemic occurred in greater Copenhagen during Aug. 10 to 28, 1935. It comprised about 10,000 cases. The overwhelming number of cases made it impracticable to investigate thoroughly the present question. Clinically the angina cases were quite in conformity with those of the 1926 epidemic. The disease was often accompanied by complications such as phlegmonous angina, otitis media, erysipelas, rheumatic fever, hemorrhagic nephritis and sepsis. As notification of rheumatic fever is compulsory, its frequency suddenly rose about three weeks after the great increase in angina in August. The independent reports of medical officers in various parts of the country show the very close connection between the angina epidemic and the increase of rheumatic fever following it. Discussion of some older angina epidemics shows subsequent increase in rheumatic fever. The description of these angina epidemics makes it rather probable that they have been of the same type as the two milk epidemics described, all starting off explosively and being markedly widespread within a definite, geographically well defined district. The morbidity percentage for rheumatic fever in these angina epidemics is about 3 per cent. In the majority of cases it is a primary attack. In all the examined cases streptococci were isolated from the tonsils. In the two recent milk epidemics the organisms identified were beta-hemolytic streptococci. It has not been possible to reexamine the patients to ascertain cardiac complications.

Book Notices

Hugh Young: A Surgeon's Autobiography. Cloth. Price, $5. Pp. 554, with over 100 drawings by William P. Didusch and 3 color prints. New York: Harcourt, Brace & Co., 1940.

I Remember: The Autobiography of Abraham Flexner. Cloth. Price, $3.75. Pp. 414, with portraits. New York: Simon & Schuster, 1940.

A Surgeon's Life: The Autobiography of J. M. T. Finney. Cloth. Price, $3.50. Pp. 396, with portrait. New York: G. P. Putnam's Sons, 1940.

L. Emmett Holt: Pioneer of a Children's Century. By R. L. Duffus and L. Emmett Holt Jr. Foreword by Edwards A. Park, M.D., Professor of Pediatrics, Johns Hopkins University, Baltimore. Cloth. Price, $3. Pp. 295, with 19 illustrations. New York & London: D. Appleton-Century Company, Incorporated, 1940.

The Life of Sir William Osler. By Harvey Cushing. Complete in One Volume. Cloth. Price, $5. Pp. 1,417, with 11 illustrations. New York, Toronto & London: Oxford University Press, 1940.

Among biographies and autobiographies, 1940 might well be characterized as Johns Hopkins year, with the great likelihood that the series will be climaxed by the new life of William H. Welch written by Dr. Simon Flexner.

The "Life of Sir William Osler," for which Harvey Cushing received the Pulitzer prize, is now made available in a one volume edition at a price representing about one half what a student would pay for an ordinary textbook. In a medical career, reading of the "Life of Sir William Osler" will certainly help the student as much as most available textbooks. This book is heartily recommended to every medical student and practicing physician. If the art of medical practice is not enhanced by reading this book, it will at least do much to aid the reader's literary style.

Of chief interest in the autobiography of Abraham Flexner, for medical readers, is the record of the manner in which Mr. Flexner was influenced by German medical education. This influence has had its repercussion on many an American medical school, including particularly Johns Hopkins University School of Medicine, Washington University School of Medicine, Vanderbilt University School of Medicine, Cornell and the University of Chicago. For Mr. Flexner German medical education, as it existed before the Nazis, has been the ideal. To him a full time faculty in both preclinical and clinical branches represents all that is superb. Among physicians generally there has been some doubt as to some of the parts of this program. There is no agreement on the necessity for having all full time teachers in the clinical branches, particularly the specialties. Many physicians feel that such a system is ideal for the training of teachers and investigators but that it fails to emphasize those aspects of medical practice chiefly concerned in the care of the sick.

Mr. Flexner has had, however, a career which extended his influence far beyond the field of medicine. His point of view has done much to determine other aspects of education and culture. He records his life from the time he first began to study in Louisville to the day when he departed from the Institute for Advanced Study in Princeton. In that period he had innumerable contacts with great philanthropists, and he studied such varied problems as general education and the spread of prostitution. His sense of humor saves many a stilted passage from being trite. Certainly one must enjoy with him his technic in the handling of men of great wealth who found themselves beyond their depth in matters of culture and education.

If there is any fault at all to find, it is in the didacticism which is the mark of the teacher. Nowhere in this book is there any indication that its author may occasionally have supported a wrong point of view. Nowhere is there any recognition of the possibility that progress may have been delayed by a too rigid insistence on the author's own principles.

Dr. Hugh Young writes colorfully of the life and development of medical practice of a great pioneer in the new specialty of urology. He was born in Texas, graduated from the University of Virginia, did postgraduate training in Johns Hopkins Hospital and became a citizen of the world. He has brought to all his work a vast enjoyment, and those who know Dr. Hugh Young will read his enjoyment in the writing of his autobiography in every page of this work. Primary among its features is the story of the development and improvement of the cystoscope. The name of Dr. Young is associated with innumerable devices involved in genito-urinary surgery. The great names which are featured in the pages of this book include those of President Wilson, President Quezon of the Philippines, "Diamond" Jim Brady, Ambassador Bingham, General Pershing, Harvey Cushing, Jesse Jones and Governor Ritchie—names familiar to all in our generation. The influence of Dr. Hugh Young was largely responsible for the establishment of the Brady Institute, from which have come many notable discoveries.

Much of this book is concerned with the work of Dr. Young as head of the urologic and venereal disease services in the World War. These war experiences are replete with personalities and with humor—the latter of the type definitely related to Dr. Young's specialty.

A conspicuous and extraordinary feature of this volume is the surgical illustrations. Whether or not to include them was many times debated in the mind of Dr. Young and often discussed with his friends and advisers. Certainly for the average reader, even fairly well educated, they are somewhat too profuse and quite technical. Nevertheless, it was Mr. Mencken's advice that these pictures be included, since they are intimately a part of the life of the author and indeed the very mark of many of his scientific contributions.

Here is a book which will do much to enlighten many a young man in the story of medical practice in our times. Toward the end of the book come a number of chapters touching but lightly on many minor interests of Dr. Young, including his memberships in medical organizations, his travels abroad and his association with innumerable civic committees. The autobiography of Dr. Young is a record of a great medical citizen who has enjoyed his life and who quite evidently is delighted to tell about it.

For fifty years the name of Dr. J. M. T. Finney has been an inspiration to young men in medicine and particularly to those in surgery. He was born in Natchez, Mississippi, more than three quarters of a century ago. He received his bachelor's degree at Princeton in 1884 and his M.D. at Harvard Medical School in 1889. Finney was a member of the football teams of both universities, since colleges were not in those days limited to three years of service of an undergraduate. As one reads the life of Dr. Finney, one might be inclined to recommend to a young man, as one of the important factors for success, a place on the football team of his alma mater. Unquestionably it brought Dr. Finney many important contacts. However, there are too many football men whose careers end with that contribution to our civilization to accept the idea as a scientific one.

From Harvard University Dr. Finney went to the Massachusetts General Hospital, and from there he went to aid Halsted at the Johns Hopkins Hospital. The time was the beginning of the careers of Halsted, Osler, Kelly and Welch —a period as well reflected in Finney's autobiography as in many of the other books available.

The story tells of a Scotchman with a real Scotch sense of humor—and there is something quite distinctive about that. It includes a personal evaluation of many a great figure in medicine, and an evaluation well worth having. The beginning of clean surgery and the development of rubber gloves is carefully recorded with innumerable accounts of the details of a surgical practice. Occasionally come poems written by brilliant members of the Finney family. As one reads the autobiography of Dr. Finney, one becomes increasingly interested in the intimate anecdotes discussing affairs of the recent past. Not the least interesting is the chapter describing how Finney was sent home from France to tell President Wilson that General Pershing wanted Merritte Ireland as surgeon general following the retirement of Gorgas.

The section describing the illnesses of Mrs. Harding and of President Harding is most enlightening concerning the inability of many a person in high places to judge for himself in matters medical. One finds anecdotes of President Coolidge, of Dr. Thayer and of other names great in the history of medicine.

As this book draws to its close, several chapters reveal the philosophy of living that has given to Dr. Finney increasingly the respect of all of medicine. Here, for instance, is his view of the hospital:

> To summarize, a hospital is primarily a place in which sick people are cared for. Their comfort and welfare should always take precedence over everything else. The less red tape in the way of hospital rules and regulations, the better. These latter are only for those who need them and should be kept in the background for use only as occasion requires. Courtesy, kindness, friendliness and consideration are qualities that add greatly to a hospital's effectiveness. Of course, the acid test of a hospital is in the character and results of the professional treatment received there. This in turn depends largely on the personnel of the professional staff, its training and ability. Much depends too on the character of the nursing. Unless these are up to the mark, little else matters, but granted they are what they should be, the other considerations add greatly to a hospital's efficiency and to the welfare, both physical and mental, of the patient, and be it remembered that without them the highest degree of efficiency is unattainable.
>
> In what has just been said, I have been referring to hospitals in general. So-called teaching hospitals, that is those connected with medical schools, differ from others in that the patients are studied by medical students and used as subjects for clinical teaching by members of the visiting staff. The function of the teaching hospital is twofold: humanitarian and educational. These two functions are not antagonistic but rather complementary and, when properly conducted, work no hardship to the patient. Quite the contrary, it reacts to his advantage in that cases which are used for clinical demonstrations are as a rule worked up very thoroughly; more so, if possible, than with the general average of patients. Then too, in demonstrating them before the class the instructor exercises of necessity the greatest possible care in establishing a correct diagnosis and carrying out the line of treatment indicated.
>
> That hospital in which the welfare of the patient from every angle is the prime consideration of every member of the staff, professional or lay, will never want for grateful patients who will continually sing its praises, in season and out, and not infrequently show their gratitude in a more material fashion.

Here too is an anecdote concerning the Henry Ford Hospital in Detroit, which was planned as an institution that would run without a deficit but which Mr. Ford later admitted had never yet broken even.

There are sections on the nurse and on fee splitting and on socialized medicine, and there is an encouraging statement which urges the American medical profession to support the ideals and objectives of the American Medical Association. Here Dr. Finney says:

> Organized medicine is prepared to do everything in its power to provide adequate medical care for every one who needs the services of a physician. It stands to reason that the members of the medical profession, since this matter of the public health is their especial province, are the proper persons to bear the responsibility, and, so long as political interference in the form of governmental control can be kept out of the picture, they may safely be trusted to find a satisfactory solution.

Indeed, one cannot forbear to quote a final few sentences:

> Elsewhere I have endeavored to define medicine as "a profession ennobled by men actuated solely by their desire to devote their time and their talents to the relief of suffering humanity, willing, yes glad, at any time, if need be, to lay down their own lives for those of their fellowmen; whose membership should embrace only men of singleness of purpose, unselfish, high minded, zealous in their efforts to wrest from Nature the keys to her many mysteries; men who, unconsciously perhaps, in character and conduct reflect in varying degree the life and spirit of 'The Great Physician'; a profession free from taint of commercialism or graft; in which there shall be no room for the base, the unscrupulous, the ignorant or the unskilled; in which the test for membership has to do only with character and attainment." Are our ideals too high? Are we striving after the unattainable? After over fifty years of close association with members of the profession, frankly I do not think so. Unquestionably, not all members of the medical profession measure up to these requirements. But doctors are only human, as a class perhaps more human than any similar group of individuals, because from the very character of their work they gain such insight into human nature and thus come to understand it so well and respect it so highly. This is one of the chief characteristics of the true doctor and one of the crowning glories of a profession most exacting in its demands upon the time and talents of its members, and at the same time offering unlimited opportunities for usefulness in the way of service to humanity. It is this human element, this call to the aid of his fellowmen, wherein lies the charm that appeals so strongly to the true physician. The joy and satisfaction experienced in relieving the ills and ministering to the wants of humanity more than compensate him for the loss of the larger social and pecuniary returns that come from other less onerous and responsible vocations. The true physician is supremely happy in his work. He could not be happy doing anything else. Once having caught the vision as it unfolds before his gaze, all else fades into insignificance.

Most recent is the biography of L. Emmett Holt, written by a distinguished writer, Mr. R. L. Duffus, and by Dr. L. Emmett Holt Jr. For some time it has been thought that after the Bible the next best seller of all time has been "The Care and Feeding of Children," written by Dr. L. Emmett Holt.

This book traces the life of Holt from his boyhood in a small town in New York State to his death following his retirement as professor of the diseases of children at Johns Hopkins University. It is a bright but not a distinguished picture, since it partakes a little too much of the diary and chronological record. Here, however, is the story of the beginning of the *Archives of Pediatrics* and of the *American Journal of Diseases of Children*. Here is an account of the coming of antitoxin to aid the physician in his attack on diphtheria and of the crucial years which saw the development of hospitals for children. Here is the story of the production of "Diseases of Infancy and Childhood" as a fundamental textbook in pediatric practice. In his work Dr. Holt traveled throughout the United States and many foreign countries, and the concluding chapters of the book are largely devoted to letters sent home from many of these trips.

This book will be of great interest, therefore, particularly to pediatricians. It somehow lacks the depth and philosophy of Finney's autobiograhy, the dynamism and enjoyment of the life of Hugh Young. No doubt the comparison is invidious. Yet at the time when the records of the lives of the men of Hopkins have come in such multiple quantities, it is a comparison which must inevitably be made. Knowing the great contribution of Dr. Holt, one feels perhaps that his biographers were somewhat too close to their subject to realize that his fundamental contribution was the projection of vast knowledge of benefit to the public in such a form as to make it available to all mankind. For that pioneer contribution, if for no other, his name deserves enduring fame. One would have welcomed a long chapter indicating clearly the story of the reception of this effort by the medical profession and the manner in which it ultimately won acclaim.

In these five books is the history of an epoch. They constitute valuable source material for every student of the history of medicine. They represent many hours of enjoyable reading and many a moment of inspiration for every student of medical science.

Vitamin Therapy in General Practice. By Edgar S. Gordon, M.D., M.A., Associate in Medicine and Instructor in Physiological Chemistry, University of Wisconsin, Madison, and Elmer L. Sevringhaus, M.D., F.A.C.P., Professor of Medicine, University of Wisconsin, Madison. Cloth. Price, $2.75. Pp. 258, with 35 illustrations. Chicago: Year Book Publishers, Inc., 1940.

This little volume is an excellent guide to the intelligent and rational use of vitamins in general practice. Particularly is the first chapter recommended to every one who prescribes vitamins. Each of the next ten chapters is devoted to one substance. The text is conservatively selected and clearly presented. The majority of the illustrations exhibit the pathology of clinical deficiencies. The last eight chapters deal with nutritional requirements other than vitamins. At times this material appears oversimplified. Even the general practitioner is accustomed to reading and interpreting highly technical material and hence it appears unnecessary to write for him textual material that sacrifices factual information for simplicity. However, the information is sound and reliable. The style is smooth and the composition is lucid. The appendix contains a variety of data that may be of value. The bibliography is limited to seven textbooks and monographs published within the past two years, each covering a special phase of the subject.

Comparative Psychology: A Comprehensive Treatise. By Carl J. Warden, Ph.D., Associate Professor of Psychology, Columbia University, New York, Thomas N. Jenkins, Ph.D., Associate Professor of Psychology, New York University, and Lucien H. Warner, Ph.D., Opinion Research Corporation, New York City. Volume II: Plants and Invertebrates. Psychology Series. Albert T. Poffenberger, Ph.D., Editor, Professor of Psychology, Columbia University. Cloth. Price, $6. Pp. 1,070, with 168 illustrations. New York: Ronald Press Company, 1940.

Volumes I and III of this comprehensive treatise on comparative psychology have already been reviewed in THE JOURNAL. The present book, in contradistinction to the first volume, treating of general principles, and the third, covering the concepts of vertebrate psychology, deals with plants and invertebrates. Those who are not fully conversant with recent advances in comparative psychology may look askance at the concept of plants having mental processes and also, for that matter, invertebrates having mental processes which can be considered in psychologic terms. The plants are covered only in slight detail,

being, as a rule, nonmotile; they cannot exhibit behavior, and it is behavior on which psychologic processes of the lower living organisms is based. Bacteria, however, do behave in response to certain stimuli in a consistent fashion, and this might be called the psychology of the unicellular organisms. The remainder of the chapters in the present volume deal with the complete ascending cycle of the invertebrate from the unicellular organisms to the arthropods. It would amaze the reader not familiar with modern comparative psychology to see the comprehensive research which has been done on this subject: the reaction of the various animals to light stimuli, to sound, to sex, to motivation, and the ability to repeat certain processes which in higher animals is known as memory. All indicate elementary mental mechanisms. There is a comprehensive bibliography in this book, giving all the titles which have a bearing on the subject. In fact, a fifth of the pages of this thick monograph are used for the bibliography. The volume is too technical for the physician. It is, of course, of interest to the zoologist and the psychologist.

Introduction to Medical Biometry and Statistics. By Raymond Pearl, Professor of Biology in the School of Hygiene and Public Health, and in the Medical School, the Johns Hopkins University, Baltimore. Third edition. Cloth. Price, $7. Pp. 537, with 121 illustrations. Philadelphia and London: W. B. Saunders Company, 1940.

The previous edition of this well known text and reference book appeared in 1931, so that, as the author himself states, the present revision is considerably overdue. In the interim a number of other excellent textbooks on the handling of medical statistics and laboratory data have appeared. Among these Pearl's treatment of the subject is definitely unique. Chapter 2, on some landmarks in the history of biostatistics, is interesting and is not duplicated in any other introductory volume. The emphasis in this book lies in the field of vital statistics and there is little discussion of the statistical management of clinical data. A portion of the book can be read without any extensive knowledge of higher mathematics but its use as a textbook in connection with a formal university or medical course would be more feasible for most than as the exclusive prop of any self-training project.

The Practice of Medicine. By Jonathan Campbell Meakins, M.D., LL.D., Professor of Medicine and Director of the Department of Medicine, McGill University, Montreal. Third edition. Cloth. Price, $10. Pp. 1,430, with 562 illustrations. St. Louis: C. V. Mosby Company, 1940.

Especially interesting in this new edition are the discussions of vitamin K, hypertension, new information concerning the liver, and a vast amount of information on chemotherapy. This edition does not represent a complete reprinting but is a revision. Already the type begins to show some effects of printing and, no doubt, the next revision will demand a resetting of the material. Incidentally, on some of the pages the addition of new material, as interspersed with the older material, has made a spotty appearance. This is noticeable particularly on pages 954, 939 and 1030 as well as on many other pages. It will, perhaps, aid the reader in determining which of the material is new. Dr. Meakins' book has found a place for itself among modern textbooks on the practice of medicine.

Histopathology of the Peripheral and Central Nervous Systems. By George B. Hassin, M.D., Professor of Neurology, University of Illinois College of Medicine, Chicago. Second edition. Cloth. Price, $7.50. Pp. 554, with 302 illustrations. New York & London: Paul B. Hoeber, Inc., 1940.

This edition of Hassin's Histopathology of the Nervous System is larger and contains beautiful illustrations. It is one of the best textbooks in the field of neuropathology. This edition differs from the first by the addition of an introductory chapter on general basic features of normal and pathologic histology. In addition there is a chapter on diseases of the cerebellum and an outline of the changes found in electrocution. There are five parts consisting of general considerations, diseases of the peripheral nerves, diseases of the spinal cord, diseases of the brain and staining methods. Hassin does not differentiate between neuritis and neuropathy but describes the types found in various disease entities. The author's chapters on inflammatory and degenerative diseases are excellent. Many parts in the present volume have been revised. The part on staining is extremely practical and makes an added reason for having this book in one's library or laboratory. The bibliography is large. The book is highly recommended to all neurologists, neurosurgeons, pathologists and those physicians interested in histopathology.

Books for Tired Eyes: A List of Books in Large Print. Compiled by Charlotte Matson and Dorothy Wurzburg. Third edition. Paper. Price, 65 cents. Pp. 80. Chicago: American Library Association, 1940.

Here is a valuable pamphlet with lists of books that are printed in 12, 14 and 18 point type which are recommended for readers of various ages and classifications. The volume should be especially useful for persons of advanced years. There is a section on juvenile books which should be especially interesting to teachers.

Séro-diagnostic de la syphilis: Etudes comparatives de la sensibilité et de la spécificité de différentes réactions actuellement employées. Par Th. M. Vogelsang, chef de service de séro-bactériologie, laboratoire anatomo-pathologique du Dr. F. G. Gade à Bergen, Norvège. Paper. Pp. 217, with 11 illustrations. Bergen: J. W. Eides Boktrykkeri, 1940.

According to the author, the volume presents a comparative study of the sensitivity and specificity of different tests employed in the serum diagnosis of syphilis. After a brief introductory discussion of the phenomena of complement fixation and precipitation in syphilis, the technics of the several tests are considered, followed by comparative results obtained with these tests in the author's laboratory. Serologic studies reported during recent years by the American evaluation committee on serodiagnostic methods, in which the tests are carried out by the respective authors, are of greater value in establishing the dependability of the respective methods.

National Research Council of Canada, Review of Activities for the Year Ended March, 1939. Published under the authority of the Hon. W. D. Euler, Chairman of the Committee of the Privy Council on Scientific and Industrial Research. N. R. C. No. 871. Paper. Price, 75 cents. Pp. 175. Ottawa, 1939.

Here are summarized the investigations carried out by this body to the end of March 1939. The research covers a wide field. Practically all the work done in the field of medicine has been previously published in medical periodicals. The budget for 1939-1940 approximates $53,000 and the projects already approved are in the field of medical radiology, tuberculosis and rheumatic diseases. Minor grants have been made for problems relating to cancer, heart disease, chemotherapy, hormones and vitamins. Especially interesting is the number of researches in the field of aviation from every point of view.

Edinburgh Post-Graduate Lectures in Medicine. Volume I. Published for the Honyman Gillespie Trust. Cloth. Price, 10s. 6d. Pp. 513, with illustrations. Edinburgh & London: Oliver & Boyd, 1940.

This is a collection of a series of lectures given at Edinburgh University under a grant by an Edinburgh philanthropist. These thirty-three lectures were originally published in the *Edinburgh Medical Journal,* and before publication each contributor had opportunity to revise his material and bring it up to date. The problem of postgraduate teaching is discussed by Edwin Bramwell, who urges the establishment in Edinburgh of a postgraduate school which will provide not only "refresher" work but also more advanced and specialized teaching. The thirty-three lectures cover almost every phase of modern medical interest. Every physician will find here material helpful to him in his daily work.

Food Values of Portions Commonly Used. First edition compiled by Anna dePlanter Bowes, M.A., Director, Nutrition Education, Philadelphia Child Health Society, Philadelphia, and Charles F. Church, M.D., M.S. Third edition revised by Senior Author. Paper. Price, $1. Pp. 31. Philadelphia. The Author, 1940.

This pamphlet, first published in 1937, is here brought up to date. Vitamin values are now expressed in international units when possible. There are also discussions of the effects of cooking on food values, and a summary of dietary requirements at various ages has been added. There is also some bibliography. The elements of information in the field of nutrition are not elsewhere more authentically stated than in these tables. Particularly valuable is the expression of data in measurements of approximate servings.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

PAROXYSMAL AURICULAR FIBRILLATION

To the Editor:—A man aged 69 was found eight years ago to have a duodenal ulcer, for which he received the customary treatment. He simultaneously had periodic attacks of auricular fibrillation, which came on suddenly and, on his lying down in time, quit as suddenly as they appeared. With these occurred frequency of urination every twenty or thirty minutes, of large quantities of light colored urine. He remained on a strict diet for about four years, during which time he had the periodic attacks of auricular fibrillation. About this time he began eating anything that he wanted and after a time had a recurrence of the ulcer symptoms. He then went on a strict diet for a year since which time he has had no trouble along that line, merely avoiding fried foods. The periodic attacks of fibrillation have continued. Early in the progress of this condition he was digitalized and given ¾ of a grain of phenobarbital three times a day and finally it was discovered that the only medication that would stop the fibrillation was nembutal given in large doses, 3 to 6 grains, which put him to sleep and on awakening the fibrillation had ceased. Large doses of quinidine had no effect whatsoever. He has had no dyspnea with the attacks or at any other time. The heart is not enlarged, there are no murmurs and no arrhythmia, except an occasional extra systole. The first electrocardiograph showed no abnormality except one extra systole. A later electrocardiograph showed a slight auriculoventricular block, perhaps due to the digitalis. An electrocardiogram taken during the attack showed only fibrillation. He has never used liquor to excess and quit smoking 8 years ago. The blood pressure varies from 140 to 160 systolic and 80 to 90 diastolic. He is an active man and looks younger than his years. He is decidedly uncomfortable in high temperatures and sweats profusely. Physical examination showed nothing abnormal. Wassermann and Kahn tests were negative and the basal metabolism was within normal limits. I would like your opinion as to the probable cause of these attacks and suggestions as to therapy.

M.D., Montana

ANSWER.—The occurrence of paroxysmal auricular fibrillation in elderly persons is common and attributable to any one of many different exciting factors, only one of which is heart disease itself, although it is probably true that the combination of certain abnormalities of the heart and exciting factors especially favors its occurrence. There is no common association between duodenal ulcer and its treatment and paroxysmal auricular fibrillation.

A frequent symptom associated with paroxysmal tachycardia of any sort is frequency of urination and increase in amount of urine with low specific gravity.

The prognosis of paroxysmal auricular fibrillation is generally good as to life in the absence of evidence of important heart disease but uncertain as to persistent recurrence of the attacks.

The treatment is often difficult. Quinidine acts more favorably as a rule than other drugs, both from the standpoint of prevention and of treatment. It may be that in this particular patient, quinidine sulfate given in daily rations of three grains, 3, 4 or 5 times in twenty-four hours, over periods of months, might help to reduce the number and duration of the attacks. Even that it was ineffective on one or two occasions does not mean that it would not have some value over a long period of time. Digitalis is the drug of choice after quinidine and if quinidine is ineffective. It has two values; in the first place, under digitalis the heart rate tends to be less rapid during the paroxysms of fibrillation, and in the second place, the digitalis effect tends to establish permanent fibrillation with a reasonably slow ventricular rate which is a much more comfortable state than that of paroxysmal fibrillation when the paroxysms occur frequently.

POSTCONCUSSION SYNDROME

To the Editor:—1. What is the effect on a patient suffering from a postconcussion syndrome of (*a*) heat over 90 F. and of (*b*) overactivity? 2. What is the mechanism? 3. Please give references. 4. What is the treatment of postconcussion syndrome, including the advisability of resuming work?

M.D., Massachusetts.

ANSWER.—The diagnosis of postconcussion syndrome should be limited to a condition arising from the result of brain injury in which there is a transient loss of, or a defect in, consciousness. There is no recognizable pathologic change in the brain substance, as this is a temporary state and the patient makes a rapid and complete recovery. There is no chronic postconcussional state. Frequently the term postconcussional is used when postcontusional is really meant.

1. (*a*) Heat over 90 F., depending on the maximum temperature reached, should give increased headache, dizziness, emotional instability, irritability, mental confusion, increased pulse rate and perhaps an elevation of body temperature. The symptoms would depend on the age of the patient and on the severity of the condition. (*b*) Overactivity will act similarly to heat, of course depending on the severity of the symptoms. There may be an increased headache, inability to concentrate, increased loss of sleep and libido, intolerance to noise, easy fatigue, increased irritability with a tendency to avoid friends, and a decreased tolerance for alcohol.

2. Little is known of the pathology, as patients who present opportunity for clinical study recover rapidly and no postmortem examination is possible. If they die it is usually right after the accident and the time is insufficient to study symptoms. Trotter suggests that concussion is the result of momentary cerebral anemia from the compression or indentation of the skull. Others suggest that it may be a transitory cerebral edema.

3. "Injuries of the Skull, Brain and Spinal Cord," edited by Samuel Brock (Baltimore, Williams & Wilkins Company, 1940) has a chapter on concussion and contusion of the brain.

4. Treatment indicated is rest, both mental and physical, with mild sedation. A spinal puncture is indicated and, if the pressure is high, dehydration should be instituted. As the patient recovers completely in a short time there is no reason why he should not return to work. Special care should be taken to avoid a neurosis.

SUBCUTANEOUS OXYGEN FOR ASTHMA

To the Editor:—Please discuss the use of oxygen by subcutaneous injection for the treatment of asthma.

Galen M. Hover, M.D., Fort Riley, Kan.

ANSWER.—The use of oxygen subcutaneously was introduced by Bayeux of Paris in 1922. A review of the literature yields no clinical summary of its use in the treatment of asthma. This mode of oxygen therapy was instituted primarily for the treatment of pneumonia. Simon and Kirk, who advocate its use for asthma merely mention it as one of a half dozen conditions wherein it may be indicated. In general, they state that all conditions wherein an anoxia and asphyxia are present call for oxygen aid. Since the lungs may be so congested that pulmonary exchange of air is seriously hampered, they point out that subcutaneous absorption of air may be life saving. They advocate from 400 to 1,200 cc. of oxygen subcutaneously in a twenty-four hour period. The presence of crepitation indicates that the oxygen injected is not yet completely absorbed. The amount of oxygen consumed subcutaneously is small as compared to the volume used by funnel, catheter, mask or chamber. To this the sponsors of subcutaneous oxygen therapy state that the difference between the body's oxygen demand and supply is small and the need can be adequately fulfilled by the slow absorption of the subcutaneous oxygen. There are no statistics to verify their claims. The amount of oxygen injected is not sufficient to alter materially the oxygen content of the blood. Almost no one with large experience in the treatment of severe asthma uses oxygen by injections. Helium with oxygen has been used by some.

References:

Bayeux, R.: Subcutaneous Injection of Oxygen in Influenza, *Bull. Acad. de méd.*, Paris **87**: 176 (Feb. 7) 1922.

Simon, O. B.: Subcutaneous Oxygen Therapy, *Clin. Med. & Surg.* **40**: 155 (March) 1933.

Kirk, T. S.: Use of Subcutaneous Injections of Oxygen, *Brit. M. J.* **2**: 195 (Aug. 4) 1928.

WELTMAN SERUM COAGULATION REACTION

To the Editor:—What is the status of the Weltman reaction or test? Is it of any particular value; or can it add nothing to what clinical manifestations plus white blood count and differential and a determination of the sedimentation rate will reveal?

M.D., Territory of Hawaii.

ANSWER.—The Weltman serum coagulation reaction has, if one is to judge from the literature, been used extensively in continental Europe, in particular in Austria and Germany. Evidently the reaction has been studied and used to only a small extent in the United States.

Exponents of the test believe that it aids in differentiating exudative and necrotic processes and nephrosis on the one hand

and parenchymatous damage of the liver, fibrotic processes or hemolytic processes on the other. All have agreed that the test is nonspecific in the sense that it does not establish the diagnosis of any particular disease. Attempts have been made to use it in the differential diagnosis of intrahepatic and extrahepatic jaundice, but the evidence does not warrant the conclusion that it serves any particularly useful purpose in this regard.

It is said that the study of the coagulation band offers more information than a study of the sedimentation rate, since sedimentation rates usually are increased in a wider group of diseases than those which show alteration of the coagulation band. Counts of leukocytes and differential counts usually are not particularly diagnostic in the types of diseases for which the determination of the coagulation band has been recommended.

It is doubtful whether the time will ever come when a careful clinical history and examination can be replaced by any single laboratory test.

ASEPTIC PRECAUTIONS FOR VAGINAL EXAMINATION DURING LABOR

To the Editor:—**It is routine at this hospital for the supervising nurses in the maternity division to do vaginal examinations on patients in labor. The progress is followed in this manner. I am a young physician still in training. Before coming here I had always been taught that vaginal examinations should be done only under the most aseptic conditions. When I make rectal examinations I can see the smiles around me. I have been told that the dangers of vaginal examinations are mostly theoretical and that when I am out for a time I will soon "wise up" and forget most of the medical school theory. Now my question is Are vaginal examinations a dangerous procedure? Are they done commonly by men in practice?**

M.D., Pennsylvania.

ANSWER.—Yes, a vaginal examination without strict aseptic precautions can carry with it real danger. The possibility of thus introducing infection naturally is greater in an environment abounding in infective bacteria. In her own home a woman is exposed only to the germs to which she has become more or less immune, and the most dangerous agent that comes into the birth room is the doctor. Therefore even here aseptic precautions cannot be neglected.

To obviate most of these perils, rectal examinations for both kinds of practice are advised, but even these must be practiced with due regard to the rules of aseptic operating, and of the physiology of the pelvic organs.

Most physicians in country practice use sterilized rubber gloves and aseptic and antiseptic precautions in their obstetric work. Naturally their methods need not be so cumbersome as in hospital practice, but the principles of clean technic are indispensable.

MÉNIÈRE'S DISEASE AND HISTAMINE

To the Editor:—**A woman 30 years old and apparently in good health presents symptoms suggestive of Ménière's syndrome. She has had attacks of vertigo lasting for five to ten minutes for the last three years, which have been worse during the past three months. At the time of the attack she is too dizzy to walk. Excitement is often a precursor to an attack. She may have an attack every day or once a month. She never faints. She has an aura of the attack which consists of a "click" in the left ear, then vertigo and a feeling of pressure in the ear; then there is a "buzzing" in the ear and the attack is over. Has histamine proved of value in the treatment of this condition? What other treatment is recommended?**

M.D., Minnesota.

To the Editor:—**What value does histamine have in the treatment of Ménière's disease? If some chance of helping not fraught with too much danger exists, I would like to try it on a 58 year old man. Will you give dosage, technic and contraindications? I just noticed a newspaper account of it quoting Dr. Bayard T. Horton.**

Odis A. Cook, M.D., Anadarko, Okla.

ANSWER.—The 30 year old patient gives a characteristic clinical picture of Ménière's syndrome. The treatment should aim to remove any etiologic factors, and this, in many cases, suffices. Focal infection, food allergy, suppurative otitis media or excessive fluid intake are the most frequent causes. If no etiologic factors can be found, symptomatic treatment must be resorted to. Furstenberg's salt free diet with fluid intake limited to less than 1,000 cc. a day with or without the administration of ammonium chloride, 45 grains (3 Gm.) three times a day is effective in many cases.

Histamine acid phosphate has been used intravenously, 1.9 mg. in 250 cc. of physiologic solution of sodium chloride being given slowly at the rate of one drop per second by intravenous drip taking one or two hours to give (Shelden, C. H., and Horton, B. T.: Treatment of Menière's Disease with Histamine Administered Intravenously, *Proc. Staff Meet., Mayo Clin.* **15**:17 [Jan. 10] 1940). This is not without risk because of the possibility of too rapid administration with acute histamine shock. It is chiefly used during an acute attack, but since such attacks are in nearly all cases of short duration it is not usually necessary. The Furstenberg regimen is far safer and probably gives as satsifactory results.

PAROXYSMAL TACHYCARDIA AND ALLERGY

To the Editor:—**A woman for the past seventeen years has been having attacks of paroxysmal tachycardia. These attacks began with the menopause and though she is more than 60 years old she still has them, more frequent lately than before. They appear irregularly, sometimes once a week or perhaps only once a month, while occasionally there is an interval of only three days. The attack never relieves itself nor does vagus stimulation seem to have any effect. No drug has any effect except a hypodermic injection of morphine. She vomits in about twenty minutes and the attack is over. I have noticed of late years that the attacks seem to follow the ingestion of fresh fruit, particularly citrus fruits. I wonder whether the cause of her tachycardia could be allergic. I have never heard or read that any one had considered this functional heart condition to be allergic and I hope that you can give me some information on the matter. Needless to say she has been advised not to eat foods that seem to bring on her "heart attacks" but apparently she can't resist temptation.**

Edward E. Williams, M.D., Naugatuck, Conn.

ANSWER.—The suggestion that paroxysmal tachycardia may, in certain instances, be on an allergic basis has been made by Thomas and Post in this country and Laubry and Fournier in France in 1925, and more recently (1938) by Harkavy here. The evidence offered is not particularly striking, although in the two cases of paroxysmal tachycardia reported by Harkavy there was a definite tachycardia following the ingestion of foods to which the patient was particularly sensitive; in one case lamb and cauliflower being the worst offenders, in the other, shellfish and chocolate. However, there would seem to be some doubt as to whether the tachycardia was a true paroxysmal tachycardia in most of the attacks discussed. Hume in 1930 stated that he had not encountered any association between paroxysmal tachycardia and asthma and migraine, and this was reaffirmed by Campbell and Elliott in 1939. Any real proof of this mechanism is lacking, and it must be said that if allergy plays a part in the etiology of paroxysmal tachycardia it is probably a minor one, numerically speaking.

References:

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Laubry, C., and Mussio Fournier, J. C.: *Bull. et mém. Soc. méd. d. hôp. de Paris* **49**: 404 (March 13) 1925.
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Harkavy, Joseph: *J. Mount Sinai Hosp.* **5**: 273 (Nov.-Dec.) 1938.

RESISTANT URETHRITIS

To the Editor:—**A man aged 45 contracted gonorrhea four years ago. From his account it would seem that both the anterior and posterior urethras were involved. Treatment was inadequate and the discharge never wholly disappeared, turning from the original thick purulent material to thin watery exudate, which appeared from time to time during the past four years. More recently, however, this watery discharge has become more profuse and more persistent. There are no other accompanying urologic symptoms. He does complain of pain in the lumbar spine, both sacro-iliac joints and the joints of the hands. On examination a small drop of thin watery, grayish white material can be expressed manually from the urethra. The first voided specimen is cloudy with long white shreds, which fall to the bottom of the glass. These microscopically show one day nothing but epithelial cells; again they may be composed of pus cells; again they may show an admixture of the two cells. The second voided specimen for the most part is clear. The prostate is not enlarged nor are the vesicles, and the secretions are negative for pus. There are three firm strictures of the urethra running from the proximal end of the penile to the bulbous urethra. At first these would not admit more than a No. 14 bougie but now admit a No. 27 sound but no more. The remainder of the genitalia are normal. Smear and culture of the urethral pus reveal pneumococci. No other organisms have been discovered on three cultures. No typing has been done. Treatment has consisted of (a) Dilation of the strictures to No. 27; they cannot be dilated further. (b) Anterior-posterior urethral irrigations with potassium permanganate 1:8,000-1:2,000 and oxymercuric cyanide 1:1,000. (c) Urethral instillations of silver nitrate 0.5 per cent, mild protein silver 5 to 10 per cent, strong protein silver 0.25 to 1 per cent, prostatic and seminal vesicle massage, sulfanilamide, sulfapyridine and sulfathiazole in therapeutic doses as for acute gonorrhea, all to no avail. I have recently been trying a diazotized pyridine compound. Thus far no change in his discharge has been noted. Would you suggest therapy?**

M.D., Massachusetts.

ANSWER.—Urethritis, coexisting with urethral strictures, may be due either to the gonococcus or to nonspecific organisms. Nonspecific urethritis is a frequent lesion with stricture.

The treatment already given this patient would seem to be quite adequate if not carried out at intervals frequent enough to produce a chemical urethritis. Periodic soundings, massages and local injections at bimonthly or monthly intervals might be tried. Attempts to increase the size of the sound should be used cautiously. If improvement has not taken place within a reasonable time, cysto-urethroscopy should be done to search for other lesions.

STERILITY IN OPERATING ROOMS

To the Editor:—I will appreciate any information with regard to the length of time operating and delivery rooms may remain "set up" and still be considered sterile. I find that in one of our hospitals it is the practice to cover over instruments and drapes with a sheet and allow them to remain in this condition frequently for a period of more than twelve hours (without being resterilized) before being used. Kindly advise me if this is considered proper practice.

M.D., Virginia.

ANSWER.—In many hospitals the supply tables for the operations of the day are set up in the morning and covered with sterile sheets until they are ready for use. This practice is undoubtedly superior to leaving them exposed during several operations, as is sometimes done. Covered tables can be kept for many hours (provided due care is exercised in placing and removing the sterile covering) with less danger of contamination than they undergo during the process of being set up in a room with a number of occupants even if all occupants wear masks. The number of viable bacteria settling on an exposed table can be greatly reduced by the use of a suitable canopy, and it seems unlikely that an appreciable number of bacteria would gain access to a sterile supply table with a close fitting sterile cover during a twelve to fifteen hour period, particularly in an unoccupied closed room.

Ten petri dishes of blood agar exposed for from one and one-half to five hours on covered tables of sterile supplies showed an average of 10.7 colonies per dish when incubated, while four similar plates exposed under the same conditions for twenty-four hours revealed an average of only six colonies per plate.

It seems quite likely that any contamination of the sterile table occurs during the time it is being stacked rather than during the time it remains covered in an unoccupied room. The fewer colonies on the tables left covered for twenty-four hours is accounted for by the fact that they were set up for the purpose only of the culture and required less time of exposure than the other tables, which were stacked with a larger quantity of supplies for the routine operations of the day. Similar petri dishes exposed to sedimentation from the air during a routine operation may show from twenty to as many as 200 or more colonies of bacteria per hour of exposure, depending on a variety of local conditions.

If it seems desirable, either the supply table alone when exposed or the entire room can be protected continuously (from 80 to 99 per cent effective) by the use of the appropriate wavelength and intensity of ultraviolet radiation. If this is used, however, a suitable installation must be made and precautions taken to give adequate protection to the occupants of the room.

TRICHOMONAS VAGINALIS AND AMENORRHEA

To the Editor:—Is the vaginal mucosa in patients with functional amenorrhea more prone to Trichomonas infection than in normally menstruating women? I have seen three patients with amenorrhea (three or four menses a year) afflicted with Trichomonas vaginalis who were greatly improved when subjected to injections of pregnant mare's serum, the discharge and burning diminishing in severity and the menses being normalized in two, for the past five months. My experience with Streptococcus subacidus filtrate and vaccine has not been satisfactory. What is the impression of other users?

M.D., Michigan.

ANSWER.—The vaginal mucosa in patients with functional amenorrhea is not more but apparently less prone to Trichomonas infection because such infections are most uncommon in young girls and rather infrequent in women past the menopause. The improvement in the cases mentioned may have been due to the fact that pregnant mare's serum stimulated ovulation, which in turn brought about an increase in the acidity of the vaginal mucosa. It is known that estrogenic therapy in gonorrheal vulvovaginitis in children is efficacious only when the acidity of the vaginal secretion is increased. Likewise an easy way to relieve women of Trichomonas vaginalis vaginitis is to insert acid douches or similar medication into the vagina. Of course, relief experienced by the inquirer's patients may have been coincidental or may have been brought about by supplementary treatment such as douches and increased cleanliness after the attention of the patients was directed to the infection.

Falls and Hibbert (*Am. J. Obst. & Gynec.* **36**:219 [Aug.] 1938) reported excellent results in cases of Trichomonas vaginalis infection by using Streptococcus subacidus vaccine but Karnaky (quoted in the Year Book of Obstetrics and Gynecology, Chicago, Year Book Publishers, 1938, p. 421) failed to observe any benefits in 100 cases.

APPARENT RECURRENT HERPES ZOSTER

To the Editor:—A woman aged 28 has had recurring herpes zoster over a period of three years. It first started with a classic thoracic localization apparently affecting the ganglions of the posterior nerve roots and appeared with a painful vesicular cutaneous eruption of segmental distribution limited to one side of the body. Symptomatic treatment was instituted: whole blood intramuscularly, solution of posterior pituitary and much local care. From six to ten weeks after the eruption similar lesions appeared. At this time the patient was seen by dermatologists and other colleagues with always the same impression of herpes zoster. Foci of infection were sought: teeth, tonsils, sinuses, gallbladder, pelvis and rectum. No intercurrent infection was noted. The serologic reaction was negative. There was no traumatic history or any type of medication and the patient was otherwise healthy. Finally the lesions became more subtle in distribution, involving the upper division of the fifth nerve and sometimes leaving eschars. The patient gave a history of allergy in her family although having no manifestations herself. Eosinophils were found on nasal smear. Other causes were ruled out for the polymorphonuclear cells. Following grass, pollen, dander, food and other tests, specific sensitivity was shown to inhalants. Desensitization was instituted. The herpes zoster has recurred only twice in one year when desensitization was withdrawn over two weeks. We are wondering whether there is such an entity as chronic herpes zoster? If so, has it ever been controlled by desensitization?

John B. McDonald, M.D., Hollywood, Calif.

ANSWER.—The appearance of herpetic lesions calls for a differential diagnosis, which at times is extremely difficult. Herpes simplex, herpes zoster, traumatic herpes and herpes on an arsenical basis may all appear alike. The literature shows a unanimity of opinion regarding the rarity of recurrence of herpes zoster. So seldom does it recur that such instances appear as individual case reports. One attack of herpes zoster generally creates an immunity. Herpes simplex on the other hand tends to recur indefinitely. Coca mentions that occasionally herpes zoster is associated with an asthmatic attack (Coca, A. F.; Walzer, Matthew, and Thommen, A. A.: Asthma and Hay Fever, Springfield, Ill., Charles C. Thomas, 1931). He also speaks of recurrent herpes labialis (simplex) as associated with allergy to such foods as chocolate and cocoa. Since herpes zoster so seldom recurs, and since there is no known etiologic factor other than a virus, no desensitization has been done. It may be a mere coincidence that, in this case of apparent herpes zoster, attacks are becoming less frequent since the institution of desensitization therapy.

OTOGENIC DISCHARGE WITH B. PROTEUS

To the Editor:—I have tried almost all the ordinary antiseptics in an endeavor to dry up a persistent foul purulent discharge from an ear following a radical mastoidectomy. The cavity contains no exuberant granulations, it is covered with smooth epithelium except in two small areas and there is no rough bone palpable in these areas. The culture from the discharge contains only a member of the Bacillus proteus group. Any information which you can give me with regard to treatment of a local infection with Bacillus proteus will be appreciated.

M.D., Oklahoma.

ANSWER.—As the cavity described does not present evidence of carious bone, it must be assumed that the discharge comes from either the middle ear or the petrosa. The most likely place in the middle ear for the discharge to come from will be hypotympanic cells. The source of petrosal disease could be determined only by careful x-ray examination and exploratory operation undertaken to discover fistulas and diseased cell tracts.

Gerzog has written a complete article on "Bacillus Proteus in Otogenic Infections" with some suggestion as to treatment. He states that otogenous vaccines have been found useful by others, and he himself employed a stock bacteriophage.

References:

Gerzog, B. G.: Bacillus Proteus in Otogenic Infections, Secondary Mastoiditis, Thrombosis of the Lateral Sinus and Bacteremia, *Arch. Otolaryng.* **30**: 275 (Aug.) 1939.

Williams, H. L.: Chronic Suppurative Lesions of the Petrous Pyramid, ibid. **29**: 345 (Feb.) 1939.

RECURRING FRACTURES OF METATARSALS

To the Editor:—In "Fractures and Other Bone and Joint Injuries" by Watson-Jones, a book published by the Williams and Wilkins Company in 1940, I read on page 636 "Spontaneous fracture may be a recurrent disability and some cases have been recorded of as many as three fractures of the same bone occurring at intervals of several years." Could you give me any reference or other basis for this statement?

William A. Evans, Jr., M.D., Detroit.

ANSWER.—As the quotation is from the chapter wherein march fractures of the metatarsals are discussed in Watson-Jones's book, it is presumed that the inquirer refers to march fractures of the metatarsals. Recurring fractures of this type are certainly uncommon and no reference in the literature on this phase of the subject has been found. No doubt it could happen.